



**AGRICULTURAL RESEARCH INSTITUTE**

**PUSA**







DEPARTMENT OF AGRICULTURE  
AND  
TECHNICAL INSTRUCTION FOR IRELAND.

JOURNAL.

VOLUME V

[OCTOBER, 1904, TO JULY, 1905.]



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Vol. V.



No. 1.

DEPARTMENT OF AGRICULTURE

AND

TECHNICAL INSTRUCTION FOR IRELAND.

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# JOURNAL.

Early Potato Growing—The Horse in Ireland—Agricultural Co-operation in Germany—An Investigation into a Disease of Young Cattle—The Butter Trade of The Netherlands—Pig Breeding in Ireland—Commercial Education—The Apple—Official Documents—Notes and Memoranda—Statistical Tables.

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## NOTICE.

*Communications respecting the literary contents of this JOURNAL should be addressed to the Superintendent of Statistics and Intelligence Branch, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin.*

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## EARLY POTATO GROWING.\*

The rapidity with which the early potato growing industry has developed at the centres where it was started by the Department, the great interest which the experiment has evoked, and the demand for information on the subject from all parts of Ireland, make it desirable to furnish as complete a report on the subject as possible. Some growers have readily responded to the request of the Department for an account of their experiences, and these reports are in some respects more valuable than the results of the actual experiments of the Department. On the whole, the season 1904 was favourable. It is true that the spring was wet, the land ill-conditioned, and planting consequently delayed; but there were no checks from frost or drought, and the result was that, wherever the crops were well handled, heavy and early yields were obtained.

Nevertheless, it cannot be called a good year, as shrunken revenues will attest. This is entirely accounted for by the deplorably bad markets in June—even in May. Some idea of the poor prices obtained will be got from a perusal of the Jersey statistics which follow:—

### POTATO SEASON, 1904.

Statistics of the Total Weight, Value, &c., &c., of the Potato Export.

1904.	Packages.	Net Tons.	Average Weekly Price per Ton.	Weekly Totals.
			£ s. d.	£ s. d.
May 2 to May 14, ...	5,380	100	28 12 0	2,860 0 0
" 16 to " 21, ...	29,859	650	16 5 0	10,562 10 0
" 23 to " 28, ...	84,934	3,640	11 9 8	41,799 6 8
" 30 to June 4, ...	165,539 In bulk	7,100 104 }	6 1 4	43,704 5 4
June 6 to " 11, ...	329,674 In bulk	11,200 60 }	3 13 8	41,437 10 0
" 13 to " 18, ...	233,494	10,900	2 18 4	30,701 13 4
" 25 to " 25, ...	108,178	9,300	2 5 6	21,157 10 0
" 27 to July 2, ...	151,104	6,625	3 0 8	20,095 16 8
July 4 to " 9, ...	62,942	2,625	3 2 10	19,046 17 6
" 11 to " 16, ...	9,066	500	3 9 4	1,733 6 8
" 18 to " 23, ...	1,267	55	3 9 4	190 13 4
TOTALS, ...	1,181,337	52,849	—	233,289 9 6

\* See *Journal*, Vol. II., No. 2, p. 203, and Vol. III., No. 1, p. 3.

## COMPARATIVE STATEMENT.

YEAR.	Tons.	Value.	YEAR.	Tons.	Value.
		£ s. d.			£ s. d.
1884, ...	53,655	375,811 18 0	1895, ...	54,290	359,989 4 6
1885, ...	48,524	319,404 3 4	1896, ..	64,593	425,192 0 6
1886, ...	64,820	309,155 6 11	1897, ...	53,555	402,274 9 11
1887, ...	70,073	423,888 18 10	1898, ...	56,227	338,269 0 0
1898, ...	60,988	242,109 11 8	1899, ...	65,040	330,421 0 0
1889, ...	62,700	264,153 15 0	1900, ...	54,012	445,872 0 10
1890, ...	54,109	293,631 9 2	1901, ...	51,750	320,901 15 0
1891, ...	66,810	487,642 1 8	1902, ...	66,625	387,364 5 0
1892, ...	66,332	376,635 15 10	1903, ...	47,530	475,888 17 6
1893, ...	57,762	327,366 13 4	1904, ...	52,849	233,289 9 6
1894, ...	60,605	462,895 10 5			

PHILIP BARBIER, Notary Public, Steamship Agent, &c ,  
Jersey, 29th July, 1904. 15, Mulcaster-street.

A glance at the last column will show that 1904 is the worst year on record, the value of shipments being less than half that of 1903, although the quantity showed an increase of over 5,000 tons.

Part of this extraordinary collapse in price is, in my opinion, due to the long-continued use of stale varieties, an error which, so far, Ireland has been able to avoid.

In Cornwall the results were much the same. Instead of the returns of from £50 to £80 per acre received in 1903, growers had to be content with £25 to £35 per acre.

Although Ireland suffered in common with others, the depreciation was not nearly so great as in the cases mentioned, and Irish growers have no need to be dismayed at the result of their efforts in what has been the most unremunerative season for early potatoes in any one's memory.

It is perhaps well to repeat here what the Department has all along endeavoured to impress, that early potato growing in Ireland is not likely to become a source of unbounded wealth, and it is a mistake for growers to start with too high expectations, incapable of attainment.

The experience of former years, and even of this bad one, goes to show that, with suitable conditions, good management, forethought and industry, a revenue of from £30 to £40 per statute

acre for the growing crop is attainable. More than this it is not reasonable to expect, as a general rule, although it may often be exceeded in exceptional circumstances. The value of the after crop has also to be reckoned. In many cases valuable crops of broccoli and other "greens" are got, and the turnip crops are often better than those sown as main crops.

In Co. Sligo the Department had three new experimental plots—

**Mr. Williams, Half-Quarter, Ballysodare,**  
**Some Irish Results.** grew 49 poles 20 rds., the produce of which  
 —raised from 16th June to 23rd June and  
 exported to Glasgow—yielded a net revenue of £20 5s. 4d. per  
 statute acre. "Ninetyfold" gave best results. Mr. J. Keany,  
 Breeague, grew 1 rd. 25 po., and the net revenue was £17 per  
 statute acre. This is a disappointing result, as, when I inspected  
 the crop on May 19th, it had every appearance of being good and  
 early, and quite like giving double the return obtained. It should  
 be borne in mind, however, that the expense of marketing these  
 small plots is very great, and provides by no means a fair com-  
 parison with the results obtained by the marketing of larger quan-  
 tities. In this case, also, "Ninetyfold" did best. Mr. John  
 Young, Ballincar, Sligo, grew 1 rd. 37 po., raised 15th to 20th  
 June, and the net value was £30 per statute acre. "Puritans"  
 were weak and late, and a drawback on the crop. "Ninetyfold"  
 and "May Queen" were a splendid crop, and, in my judgment,  
 "May Queen" was best on May 19th. This crop was grown on  
 a piece of fine land, and was well managed, although too deeply  
 earthed for earliness. Mr. Young considers the experiment a great  
 success, and is justly proud of the splendid crop of turnips follow-  
 ing. I have always regarded this district, and out towards Rosse's  
 Point, as eminently suitable for early potato growing.

At Lissadell, Sir Josslyn Gore-Booth had the same field for the  
 third time in succession in early potatoes. I saw this crop on  
 May 20th. It was then in full growth and of splendid promise,  
 which, apparently, has been largely realised.

Mr. Cooper, agent for Sir Josslyn Gore-Booth, sends the following  
 complete report:—

"The result of our experiments in 1903 had proved so profitable  
 that in 1904 we planted between 7 and 8  
 statute acres. Out of these we dug and sold  
**Experiments at** a total area of 4a. 3r. 5p. I need hardly  
**Lissadell, Co. Sligo.** say that we did not find this year to be so  
 profitable as last year, the Liverpool market, especially, being

flooded in early June with Jersey potatoes. We find that a few days at the start makes a great difference, as when the prices commence to fall they come down with a rush. By this time, however, our potatoes are so well known (especially in Glasgow) that we find no difficulty in disposing of them, and we do our best to see that the potatoes are properly placed on the market.

*Farm Department.*—In 1902 we dug and sold the output of 1a. 0r. 2p.; in 1903, 2a. 2r. 0p.; and this year, 4a. 0r. 30p. (all statute measure). The varieties previously grown were “Puritan,” “Ninetyfold,” and a few “Kate Henderson”; this year we added “May Queen” and “Duke of York.” The net result of our experience up to the present has been that “Kate Henderson” has always been easily first, whilst in 1903 “Ninetyfold” beat “Puritan” both for earliness and yield. Last year, unfortunately, we sold a quantity of “Kate Henderson” in the ordinary way, but its earliness and general suitability for us here determined us this year to keep for seed the total amount grown, and not only so, but we have arranged to buy several tons of same for seed for next year. “Kate Henderson,” therefore, does not appear in the results given below.

“The following table will show the respective earliness with us of “Ninetyfold,” “May Queen,” “Duke of York,” and “Puritan”; the area and yield of each, together with the average of each per acre when lifted:—

VARIETY.	Area. (Statute).	When Lifted.	Yield.	Average Yield of each per Statute Acre.
	A. R. P.		T. C. Q. LB.	T. C. Q.
Ninetyfold, ...	0 1 38	June 7th to 11th, .	2 8 0 0	4 18 2
May Queen, ...	0 2 5	„ 13th to 15th, .	7 4 3 14	4 4 3
Duke of York, ...	0 0 37	„ 15th, . .	0 18 3 14	4 1 2
Puritan, ...	1 2 35	„ 16th to 22nd, .	8 5 1 0	4 16 0
May Queen, ...	1 0 35	„ 22nd to July 21st,	5 17 0 14	4 16 0
	4 0 30	—	19 14 0 14	4 14 0 Average yield of crop.

“From this it will be seen that, although the first dug, “Ninetyfold” proved to be the heaviest cropping variety, thus confirming our experience of last year.

“The total sold from the farm department was 19 tons 14 cwt. 14 lbs., and this, therefore, showed an average yield per statute

acre of 4 tons 14 cwt. Our average in 1903 was 5 tons per statute acre, and with this I expressed myself as being disappointed, because the yield in 1902 had been nearly 7 tons per statute acre. Mr. M. G. Wallace, Inspector for the Department of Agriculture, in his report, stated that he did not share my opinion, as 5 tons per acre in early June was very good, and certainly the yield this year has proved that he was right. I am, however, satisfied that it would not have paid us so well to have marketed the potatoes later on, even with the increased yield which, of course, would naturally result.

“The ground was manured with farmyard manure before planting the seed, at the rate of 30 tons of manure to the statute acre, whilst the artificial manure used in addition, per statute acre, was as follows:—

4 cwt. of 28 per cent. superphosphates,  
 3½ cwt. of 20 per cent. sulphate of ammonia,  
 ¾ cwt. of 35 per cent. sulphate of potash.

“It will be noted that we started digging this year on June 7th, as against June 9th in 1903, and June 17th in 1902.

“I should here, perhaps, mention that in digging for seed (July 31st) ‘Duke of York’ turned out at the rate of 10 tons per statute acre, and ‘Kate Henderson’ at 16 tons. At the time of writing we have not dug out our seed of ‘May Queen’ and ‘Ninetyfold.’ We found that ‘Puritans’ did not keep so well in sprouting boxes last winter.

“*Garden Department.*—In the Garden Department we tried 1r. 20p. with ‘Duke of York,’ ‘May Queen,’ and ‘Ashleaf Kidney,’ and here these varieties were ripe in the order given, and were dug from June 11th onwards. The yield was 1 ton 8 cwts. 1 qr. 14 lbs., which gives an average of about 3 tons 15 cwts. per statute acre. This is not a fair test, and the results of this experiment, to my mind, are hardly worth giving, as the potatoes were tried under bad conditions, in all sorts of soil, as much as anything else for the purpose of utilising odd corners, and breaking ground for following year.

“*Forest Department.*—In the Forest Nursery we tried a small experiment with ‘Duke of York’ and ‘May Queen,’ and the 35 perches dug yielded 1 ton 3 qrs., an average yield of 4 tons 14 cwt. 3 qrs. per statute acre. ‘Duke of York,’ here, were easily first.

“ The total results, therefore, show as follows :—

—	Area (Statute).	Yield.	Gross Receipts	Expenses Referred to.	Nett Receipts.
	A. R. P.	T. C. Q. LB.	£ s. d.	£ s. d.	£ s. d.
Farm, ...	4 0 30	19 14 0 14	161 1 4	23 17 2	137 4 2
Garden, ...	0 1 20	1 8 1 14	12 19 3	0 7 4	12 11 11
Forest, ...	0 0 35	1 0 3 0	7 14 6	0 12 3	7 2 3
	4 3 5	22 3 1 0	181 15 1	21 16 9	156 18 4

“ From this it will be seen that the gross amount realised for 22 tons 3 cwt. 1 qr. was £181 15s. 1d., the average amount realised per ton for the season being, therefore, £8 4s. In 1903, the 15 tons 12 cwt. 1 qr. 21 lbs. realised £159 14s. 4d., and the average per ton was over £10. This serious difference, of course, largely affected our return per acre. The gross amount received per statute acre in 1903 was £53; this year it has only been £38. The net amount realised in 1904, after paying for carriage, use of barrels, boxes, commission, and advertising, was £33 per statute acre, as against £45 in 1903. I think I am right, however, in saying that this has been an exceptional year in the early potato trade, and even the figures above have paid us very well after deducting the cost of labour, manures, carting, and all other expenses.

“ We expect to have at least 15 or 16 statute acres next year, and if ‘ Kate Henderson ’ turns out as it has done in the past, and ‘ Ninety-fold ’ as well also, we hope to be even more successful.

“ J. A. COOPER,  
*“ Agent for Sir Josslyn Gore-Booth, Bart.”*

This report is especially valuable on account of its accuracy in every detail. Enquirers could find no better reference, and it should be carefully studied. Most valuable are the careful tests with varieties. Here, also, “ Ninety-fold ” has apparently done best, although “ Kate Henderson ” is first favourite at Lissadell. Next year will prove the merits of these two kinds in competition. “ Kate Henderson ” is a potato which grows very few tubers at each root, and which comes early to size. Any one planting this variety should, therefore, plant the sets considerably closer than in the case of “ Ninety-fold.”

The new land which Sir Josslyn Gore-Booth has taken in for next year is of a much lighter character, and better suited for early potatoes. And even should the 16 acres do no better than this year's net revenue—£33 per statute acre—a handsome profit will still be shown.

In Co. Galway three experiments were tried:—

Mr. Pat. Fahy, Cluish, Kinvara, grew 60 perches, which realised at the rate of £30 12s. 9d. per statute acre, after deducting all expenses. “Ninety-fold” did best.

Mr. Edward Holland, Kinvara, grew 60 perches, the produce of which was raised at intervals from 15th June, realising at the rate of £35 per statute acre, after deducting marketing expenses. “Ninety-fold,” by a long way gave best results.

Mr. Holland comments:—

“I have no hesitation in stating, as one who has made early potato growing a speciality for the last twenty years, that the experiment was a decided success, and far above my expectations. I may also add for your information that I have all the place where the potatoes were lifted sown with turnips, and they are a splendid crop.”

Mr. Patrick Cannon, Cartron, Orammore, grew 60 perches, which were all sold locally, and, consequently, realised a much higher price, with less expenses. The result works out at £50 per statute acre.

Mr. Cannon reports “May Queen” as earliest, “Puritan” second, and “Ninety-fold” last, but much the heaviest cropper.

Although the growers of these three Galway plots are satisfied, and the revenue good enough, I cannot regard them as nearly the best that can be done. In each case the land had been allowed to get far too hard, and tubers could not expand. In the hands of such capable and experienced men I am quite sure much better can be done next year.

In Co. Clare experiments were repeated at Murroughs, where such good results were obtained in 1903, and new ground was also taken up at Liscannor and Moher. Each of the latter was an unmistakable failure. In one case, that of Mr. Scales, Kinelty, Liscannor, the crop looked as promising as could be when I saw it, on 26th May, and at that date I regarded it as one of the best and earliest crops of “Ninety-fold” in Ireland. It appears that a



few days later the crop was destroyed by a southerly gale, and growth completely checked, so that the tubers were small and of bad quality. At Murrough's there were five small experimental plots of 30 perches each. "Puritan" was the only variety planted, and all the plots were good and very early. Raising commenced on 12th June, and the net revenue per acre was from £38 13s. to £43 10s. Judging from experience in other places, if "Ninety-fold" had been planted the result would have been even better. There can be no doubt about this district being one of the earliest in Ireland, and there is plenty of suitable land. The locality is, however, grievously handicapped by distance from rail. At present I do not see how a heavy traffic could be handled, and growers there will have to strive for early raising of a light crop at high prices. All the plots at Murroughs are replanted with turnips and cabbages.

In Co. Wexford two experimental plots were planted:—

**Experiments in  
County Wexford.**

Mr. Parle, Ballyhealy, Kilmore, grew 2 rds. 10 po., which were raised from 1st to 10th July and sold locally, the price realised being at the rate of £28 per acre. "May Queen" did best here. Mr. Parle says he considers it a great success, and counts a great deal upon his fine crop of turnips succeeding.

The potato crop was not early, and the yield was small. If it had been sent to an English market it would have been unremunerative. I think this district ought to do better. The land is very suitable; but though a free sandy loam it somehow seems to get very hard and sodden. The defect, I feel sure, is in method of tillage.

Mr. Patrick Byrne, Yolestown, Kilmore, grew 40 perches—a very fine and early crop, which was raised on 12th June and sold in Wexford, realising at the rate of £80 per acre. In this case "Puritan" was better than "Ninety-fold." This was a very "growthy" crop, and, in my opinion, was raised too early; better results would have been obtained ten days later.

At Kilmannock, near New Ross, Captain G. E. Barrett-Hamilton grew several acres. This was a fine crop, marred by some defects of tillage which will be avoided in future. No detailed return has been furnished, but it was sufficiently good to induce the grower to adventure 10 acres next year. If early potatoes can be grown

successfully in that neighbourhood there is no place in the South of Ireland better situated for transit to England when the new railway opens.

In order to test what could be done in an inland district an experiment was placed with Mr. Thos.

**Some other Results.** Anderson, Lenitstown, Mageny, Co. Kildare.

It was not a success—the net revenue being £25 per acre—although the crop was by no means late. Raising commenced 22nd June, and as planting was only carried out on April 13th the period of growth was very short.

In Co. Cork an experiment was tried on Whiddy Island, in Bantry Bay, where Mr. Tobin grew 1 rd. 31 per. This was a very fine crop, ready to raise as early as 4th June, and net revenue was £48 16s. 10d. per acre. “May Queen” gave best results.

At the high-lying inland district of Coachford an experiment was conducted by Mr. Carroll, the Secretary of the Committee of Agriculture for Co. Cork, on his farm there. The extent was  $\frac{1}{2}$  acre, and crop was raised on 20th June and every succeeding day till 1st July. £42 per acre was realised. “Ninety-fold” were a week earlier than “May Queen.”

At The Munster Institute the Department planted 1 ac. 2 rds. 8 po., the object being, as before, to prove what might be done on land in a climate not favourably situated as compared with sea-board places, and also to test a number of English markets. None of the produce was sold locally, but was exported to Glasgow, Liverpool, Manchester, and Newcastle-on-Tyne. In consequence of the sales being so much spread, and the consignments therefore small, much greater expense was incurred in freightage than would otherwise have been necessary. Still, after all charges for marketing are deducted, the net revenue for the growing crop is £41 17s. 3d. per acre. I regard this as very satisfactory. From such a result in this year of low prices it is plain that the crop must have been a good one. The produce was exactly 8 tons per acre. The Munster Institute crop of early potatoes was the finest I saw anywhere in Ireland, and, indeed, it would be hard to match it on the best cultivated lands in England and Scotland a month later. It was, of course, not so early as many of the sea-board districts, but there were no faults of management or tillage. The soil was properly ploughed and the drills kept loose and open, and to this I attribute much of the success.

Clonakilty, as in former years, furnishes the best illustration of the development of this industry. The **Results at Clonakilty.** great success of former years created a keen interest, and it was scarcely necessary to start any new experiments as an incentive. But the Department wished to try what could be done further afield in the directions of Timoleague, Courtmacsherry, and Galleyhead, and seven places were selected.

Many of these were failures, chiefly arising, I am sorry to say, from careless management—at all events, I could see no other reason.

Two, however, may be mentioned as having done fairly well—Mr. Timothy Lawton, whose net revenue was £32 1s. 4d. per acre. and Mr. D. McCarthy, whose crop realised at the rate of £22 13s. 2d per acre.

Much better crops, however, were obtained by those growers who had two years' experience, and the splendid fields of Monsignor O'Leary, Mr. Canty, Mr. Crowley, Mr. Cambridge, Mr. Hayes, and others, were the admiration and astonishment of the Scottish merchants who came to view the land.

One of these—Mr. Hay, of Glasgow—made a purchase of Mr. Hayes' crop of "Ninety-fold" at £50 per statute acre. The same price was offered for some other crops, but was declined—an error of judgment as events proved. The fact that strangers, who knew nothing of the capabilities of the soil, were willing to adventure such high prices, speaks volumes for the appearance of the crops. Mr. Hay permits me to say that, in spite of the very bad prices and the heavy initial expenses of working a small quantity so far from home, he had a clear 10 per cent. profit. Of course, that is not nearly enough, and growers need not expect that buyers will embark in such risks for so small a remuneration.

The other crops at Clonakilty which I have mentioned were not appreciably inferior to, or later than, Mr. Hayes', and if they had found the same kind of market, should have been worth nearly as much money. But the very sudden fall in the market affected them adversely, and growers perhaps hurried them away too quickly. As it happened, the price was quite as good a fortnight later, and the crop would have almost doubled. Still, I think growers did quite right to sell. It is not safe to reckon on prices being maintained. At that stage no one can predict what is going

to happen, and it is always good policy to sell when the price and tonnage produce a paying revenue.

Mr. O'Sullivan's crop realised	.	.	£28 per acre.
Mr. Cambridge's	„	„	37 „
Mr. Crowley's	„	„	35 „
Monsignor O'Leary's	„	.	30 „

These amounts are in addition to the seed saved for ensuing crop, and, though far short of £50 per acre, are good, and may well inspire confidence in such a disastrous year.

Rush, Co. Dublin, has had a very successful season. Their market is Dublin, where a very early variety

**Experiments in  
County Dublin.**

is wanted only in small quantity. Consequently, for the main crop a good quality second early of the "British Queen" class seems to answer best. Boxing is now generally practised, and the gain over the old system is well understood. Those who have not yet adopted the sprouting system have to be content with coming two to three weeks later. Hitherto there has been a great reluctance in Rush to apply artificial manure to early potatoes, but the value of the "Patent," as it is colloquially called, is beginning to be understood and appreciated. Those who applied artificial manure this year have had wonderful results, some declaring that their yield has been increased by from 50 to 100 per cent.

In addition to the ton of manure supplied by the Department the Co-operative Agricultural Society purchased several tons of a lower grade manure which, while giving fairly good results, was not equal to the better quality of manure supplied by the Department. For early potatoes a high-class manure compounded from soluble materials should be used.

Co. Down, though not favoured by Departmental experiments, has made extraordinary progress in early

**Experiments in  
County Down.**

potato growing. At Craigavad Mr. A. M. Kirker had 40 acres on the same land as last year. All were good, the early fields on the shore of Belfast Lough particularly so. These were sold growing, at £40 per acre, to Messrs M'Lauchlan & Co., Belfast. The early fields were planted with Sutton's "Epicure," a variety which has become very popular in Ayrshire, and which, in some soils and climates, tubers very early. I do not think, however, that it can compete with "Ninety-fold" for earliness, but it is better quality.

Comber district, at the head of Strangford Lough, grows a wide area of early potatoes, and it would be difficult to find a place more ideally suited for the purpose. The climate, of course, is not equal to the South and West, but whatever is lost in that respect is more than compensated for by contiguity to such a good market as Belfast, and by the facilities which exist for shipping to England. Seven shillings and threepence per ton freight to Manchester, and empties carried back free would be heartily welcomed at Cork. Another good district in Co. Down is the shore in the neighbourhood of Kilkeel, where the County Instructor has been conducting some experiments with good results.

The large quantities of Irish potatoes which are now being put on English markets in June, naturally cause a good deal of comment, and their merits and possibilities are keenly discussed in all the trade publications, as well as in the ordinary daily newspapers. One reference will suffice:—

**“NEW POTATOES FROM IRELAND: SUCCESSFUL MANCHESTER  
EXPERIMENT.**

“The potato dealers of this and other districts are (says the *Manchester Evening News*) greatly interested in an experiment which is being made with new potatoes of Irish growth. On Saturday the first consignment was received at Shudehill Market, and such a ready sale was obtained by Messrs. Everson & Sons, to whom they were sent, that not a box of them was left on Monday morning. The buyers were principally Lancashire merchants, and the excellent quality of the potatoes seems to have been recognised immediately, for repeat orders were sent in many cases. These cannot now be fulfilled until the next consignment arrives, probably in a day or two. Another testimony to the excellence of the potatoes was found in the prices obtained—equal to the amount received for the best quality of the Cheshire growths, and 1s. a hundred-weight above Cornish, and 2s. a hundred-weight above the Jersey prices, as they are at present. The new growths are stated to have sold freely at £8 a ton, and Cheshire growers have good cause to be concerned about the experiment, for the competition chiefly affects them. The potatoes were grown in the South of Ireland, and formed part of an experimental planting especially intended for exportation to England and Scotland. From the success that has attended the first consignment to Manchester there seems ample justification for

the belief that Ireland will in future years be sending us new potatoes almost as early as Jersey does, and there is also a probability that new growths will be obtainable for six or seven months in the year from the various places."

What is of more value is the testimony of the individual consignees who had to sell the potatoes:—

Mr. James Gray, Glasgow, writes:—

"My impression is that the Irish potatoes will be of great service for two or three weeks at the beginning of the season. We have found the quality to be much better than Ayrshire and the demand good. From past experience I consider that barrels containing six stones each are much better than larger packages."

Mr. James Fulton, Jr., Glasgow, wrote at time of raising, dated 30th June:—

"When our "Ayrshires" started our customers seemed to prefer them, and asked us to send them "Ayrshires." We therefore thought no more Irish would be wanted. However, they were not a day started with "Ayrshires" till they wanted to go back to the Irish, and that is why I wired you to begin shipping again."

Later, Mr. Fulton writes:—

"All we can say with reference to the new Irish potato trade is that, if continued on same lines as followed this year, Irish potatoes will make a way for themselves. They are good stuff and much appreciated. If the acreage increases I am certain Irish potatoes will find a ready market here. They are earlier than our Ayrshires, and come in fair quality when Ayrshires are green and practically uneatable. I am quite prepared to give them every assistance to market in larger quantity."

Such testimony from Mr. Fulton is very high praise indeed, as his *clientele* is in the best part of the city, and he is known as a "stickler" for quality.

Mr. J. D. Rawlins, Liverpool, wrote on 25th June:—

"These arrived in first-class condition: a good sample and quality, and had inducement offered, might have been dug a week earlier. The variety ('May Queen') is very suitable for our market."

Mr. John Fulton, Newcastle-on-Tyne, wrote on June 30th:—

“To-day's sample (‘May Queen’) is really first-class: fine, ripe, and well grown. Every body is pleased with them, and everything should be done that is possible to foster the trade.”

The goodwill of English consumers is very important, and happily this has been secured. It is quite certain that next year large numbers of English and Scotch merchants will visit Ireland for the express purpose of inspecting crops, interviewing growers, and making arrangements for consignments.

Marketing and transit are still the weak points. Far too small consignments are sent. It is quite unreason-

**Points for Growers.** able to expect that Railway Companies and Shipping Companies will carry a few cwts. at the favoured rates for truck loads. In centres such as Clonakilty, where the traffic is considerable, some plan can surely be devised for collecting and consigning in quantity. The early potato trade has a future in Ireland; already it has assumed considerable dimensions, and the amazing thing is that, so far as I am aware (with the single exception of M'Lauchlan & Co., of Belfast) not a man engaged in the general potato trade in Ireland has put his hand to it. The handling of this valuable crop has been entirely given over to strangers. Let no one imagine that these English and Scotch gentlemen are fired with a philanthropic spirit. Profit is their aim. When the English came first to Ireland they were invited, and they remained. Just so, if they capture the early potato trade they will keep it.

Surely Clonakilty, which sent an enterprising son to Siberia to buy butter, could furnish another to handle the produce of early potato crops, and he would find a very good living at it. Moreover, it would be far more convenient for English and Scotch consignees, than having to treat with a score of small consigners. The best kind of utensil for carrying the potatoes seems to be the small six-stone barrel, but until carriers will agree to fetch these back empty at a nominal rate it must add several shillings to the cost of each ton of potatoes. I still hope that an industry in osier baskets will spring up. These baskets could be made for a few pence each. No one should engage in growing early potatoes unless he is prepared to exercise forethought as to how he is going to dispose of them. Too much is left to chance, and there is, consequently, much unreadiness at raising time.

Although many excellent crops were raised in Ireland this year, very few were as good as they might have been. In most cases the ground was far too firm. I have not yet been quite able to fathom the cause of it, but I am inclined to think that ploughing is not as effective as it should be. The chilled digging plough should be used, which thoroughly breaks up the land, and the cultivators between drills should be allowed to go deeper and closer to the plants.

Spring dunging in drills is another cause of want of success, and it would be much better if early potato growers would resolve to abandon this practice and apply whatever farmyard manure they have in the autumn. In making enquiries I invariably receive the answer that the spring was wet and the land soft, and carts could not be got on and so the work was delayed or done in an improper manner. If manure is spread in autumn and ploughed in, the work is greatly expedited. Besides, there are many days in spring when drilling and planting could be engaged in, when it would be impossible to cart on dung without poaching and souring the land.

Another important matter is the purchasing of seed. It is a great mistake to put off this till late autumn, and this year there are many disappointments in consequence. As soon as the crop is cleared it is time to look about and see how best a supply of seed can be got from some later district. As a rule, growers of these early varieties do not hold up quantities on chance of seed orders, as if a seed market is missed, the tubers, not being edible, are practically lost. Hence the necessity of buying, or at least bespeaking a seed supply before all are sent to market in July. Jersey and Penzance buyers begin as early as June to buy seed, and in Ayrshire thousands of tons of seed are in boxes before the end of July.

It will be apparent that "Puritan" is in decadence; only in one instance has it done best in Ireland. For first early purposes "Ninety-fold" appears to be most satisfactory, and it can always be relied upon to give a good crop. In quality and appearance "May Queen" is better, and it is quite as early, but the yield is lighter.

M. G. WALLACE.



## THE HORSE IN IRELAND.

It is not intended, in this article, to discuss at length the evolution of the horse. In common with zebras and asses, he belongs to the genus *Equus* as defined by Linnæus. Though the ox, the camel, and the ass preceded the horse as beasts of burden, and did much of the work which he was called upon to do in later times, we have sufficient data concerning them—especially the ass—to enable us to form a fairly definite idea of their character and conformation in early ages.

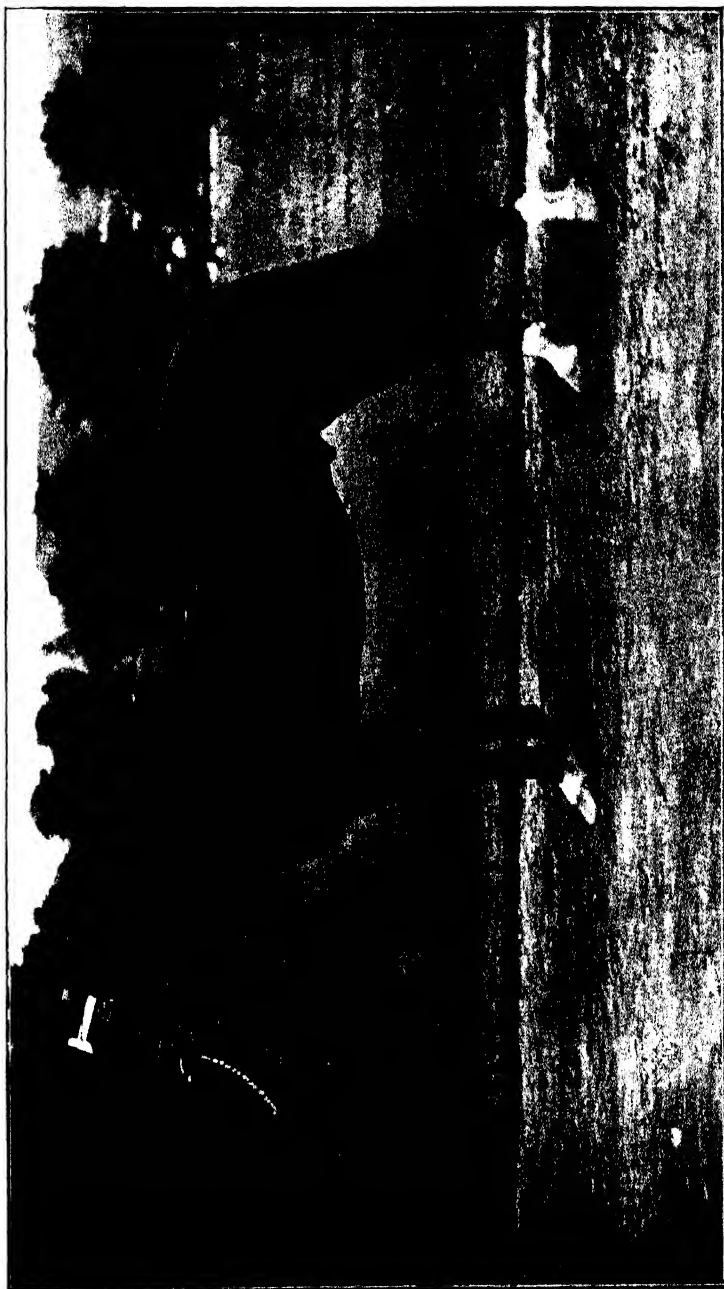
Thus we have little difficulty in realising the shape and make of the ass, as he existed in Egypt before the Christian era, and we can with readiness trace his life history amongst European nations since that time. The horse, however, presents a more difficult problem. Although the early history of the horse is obscure, we know that horses were largely used by the Romans, and history relates that a special breed was introduced by them into Britain. During the past two thousand years, but more especially about the seventeenth century, there have been numerous historical references to the introduction of Eastern horses into Europe, yet if it were asked what particular type of horse existed in Spain during the fourteenth century, in Italy during the fifteenth century, or in England during the sixteenth century, imagination, rather than sources of information, would have to be relied upon for an answer.

There can be no doubt that, apart from Arab and Barb importations, very valuable and highly-prized breeds of horses have always existed in Europe, but there are no authentic records available which could be used to describe them accurately.

The following considerations will explain, to some extent, why it is, that while we know comparatively little of the early history of the horse, the life-story of the ass is sufficiently known.

A marked characteristic of the ass is his wonderful inherent power to accommodate himself to the varying

The Horse and the Ass contrasted in reference to Variation. while retaining the distinctive points of his ancestors. There are no very great differences between the asses found in Egypt, Spain, and Ireland. Spanish asses are bigger, Egyptian asses have less hair, and are lighter in colour than ours. These are the chief





11.—Thoroughbred Stallion.

differences. Even in a state of disease, especially in the case of diseases affecting bone tissue, the ass manifests the same persistent nature. He is not prone to disease, but when once affected he recovers slowly, and is not very amenable to treatment. The horse is the antithesis of his less pretentious brother. Under natural conditions he assumes different shapes in different parts of the world; but when to this evolutionary tendency is superadded the selective interference of man, he presents himself in so many forms that the ordinary observer might entertain doubts as to the common origin of all. Indeed, Professor J. Cossar Ewart has lately (*Trans. Highland and Agric. Soc. Scotland*, 1904) given good reasons for believing that "in post-Glacial as in pre-Glacial times there were several distinct species of horses, and it is extremely probable that some of the prehistoric species and varieties have persisted almost unaltered to the present day." The "Celtic Pony" is given as a striking example of this. A consideration of the number of different types of horses, from the diminutive Shetland pony to the massive Shire, and of the varying qualities which go to form a Clydesdale, a Thorough-bred, an American trotter, and a Hackney, will give some idea of the difficulty of tracing the life history of the animal through the centuries.

Numerous as are the types of horses to be found in this country they represent only a part of the equine race.

**Local Variation in Ireland.** Throughout Ireland some particular type of horse is found in each district. The Cushendall and Connemara ponies afford striking instances of how largely horses become modified through adapting themselves to their surroundings. These ponies are admirably calculated to live and thrive and do useful work under the circumstances and amidst the surroundings in which they have been evolved. To select the class of horse required for any particular country one should first ascertain what type the operation of natural causes has produced in that country. The type of animal thus indicated should be taken as the foundation stock, and modified and improved by processes of selection and good management. It must always be borne in mind, however, that any attempt at a considerable modification of the original type formed by the operation of the natural influences of the district is certain to result in disappointment or disaster. Theories and fancies, if applied judiciously, will play a most important part in the foundation and development of any breed; but it should always be remembered

that the application of such theories and fancies should be in unison with the operation of natural laws. Many good types of animals have been ruined by the neglect of this precaution.

Without going back to the ancient history of the Irish horse, it

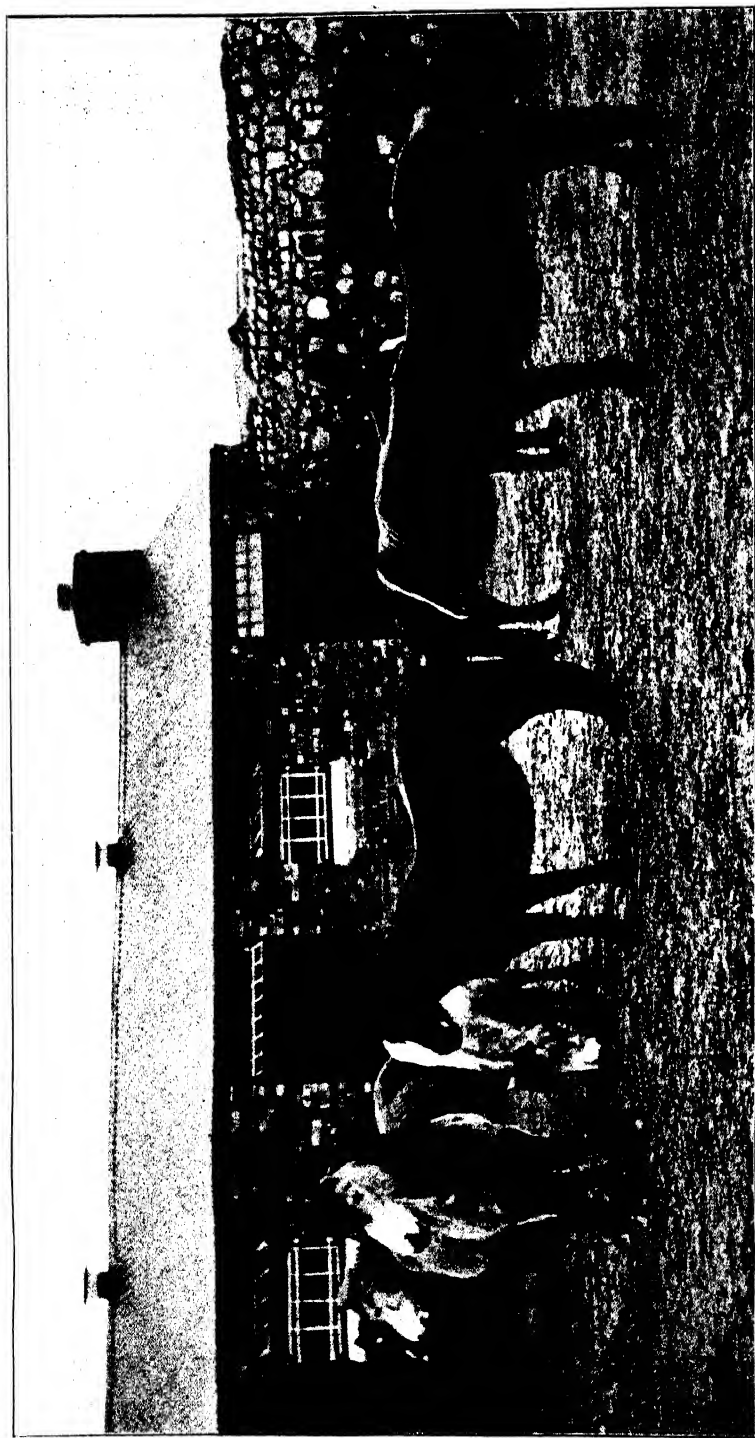
may be asked what influences do the Irish  
**Some Universal** soil and climate exert on horses bred in  
**Characteristics of** Ireland—what effect do they produce on  
**the Irish Horse.** the size, bone, hair, and temper of the  
 animal? A typical horse descended from

animals bred in Ireland during a long period, is of good size, his bone is well developed—indeed, somewhat disproportionately well developed, as compared with the rest of his body; his legs are clean, flat, and hard without the spongy softness of bone or ligament so characteristic of the British horse. The hair is fine and sparse all over the trunk, and though somewhat coarser on the legs, this coarse hair is practically confined to the back of the fetlock. The most pronounced characteristic of the Irish horse, as distinguished from horses of other countries, is his high courage. These characteristics may be stated to be fairly typical; but they vary, of course, in different parts of the country. The Connemara pony—a direct, and till recent years, an unpolluted descendant of the horse which inhabited this island from time immemorial—though dwarfed by the climatic conditions of an exposed seaboard as well as by meagre fare, still retains the high courage and stamina of his ancestors, and though somewhat modified in shape, possesses the strength and bone so characteristic of the Irish horse. Contrasting the horses bred in the eastern counties with those bred in the West of Ireland, we find that on the rich plains of Meath horses will not grow so big, are more fleshy, and though possessed of good bone scarcely equal the Roscommon horse in this respect. On the other hand, the Meath horse has more graceful lines—having more “quality”—than his Roscommon brother, who is angular and coarse; still, both evince in equal measure the characteristic of high courage.

A knowledge of the horse-breeding industry as carried out in Meath and Roscommon will convince observers of the further fact that the superior bone and size of the Roscommon horse are due to the Roscommon soil, and are produced despite the regrettably low standard of quality in the brood mares kept in that fine horse-breeding county, and the very indifferent attention paid to the young stock. On the other hand, the brood mares in Meath are



III.—Connemara Pony and Foal.



IV.—A Group of Connemara Pony Mares.

exceptionally good, as can be observed by visiting the Navan Horse Show, or by making private inspections through the county. No sire is too small to get sizeable hunters in Roscommon, whereas in other counties in Ireland small stallions are comparatively useless. Looking beyond the horse, further proof of the varying characteristics of different parts of Ireland in the production of live stock will be found in the excessive growth of Roscommon cattle and sheep, as contrasted with similar animals bred in other counties. The characteristics of the Irish horse as set forth above should be borne in mind when selecting fresh breeds for introduction into this country, and when attempting the improvement of the breeds at present located here.

The natural characteristics of the typical Irish horse are more prominently developed in the thoroughbred and the Irish draught-horse than in any other of all the breeds in the country.

A short reference to the history of each of these two breeds will be necessary in order to illustrate this view, and as the thoroughbred had an undeniable influence in the evolution of the Irish draught-horse, he should be considered first.

The history of the thoroughbred horse in recent times is well known. Bred exclusively for speed, and used entirely for racing purposes, he has long been solely judged on his merits as a race-horse. The capacity to go fast has been the great object aimed at by his breeders. Conformation and soundness, though of importance in a race-horse, went a short way towards excusing him if he failed to win races, whilst the ability to win always compensated for unsoundness or ill-looks. It is a recognised fact that many breeders of thoroughbred horses prefer, for stud purposes, an unsound or mis-shapen animal which has proved itself a good race-horse, to a shapely, sound animal that has failed to distinguish itself on the turf. Is it any wonder then that the thoroughbred horse of the present day has been brought to such perfection from the point of view of speed? Good authorities admit that the famous Eclipse, if he appeared to-day on our race courses, would have to take a place amongst selling platers if asked to race over five, six, or seven furlongs. Though the stud-book, since its institution, has recorded all the progeny of thoroughbreds, and, after the most conservative manner, kept intact the families which at that time obtained places in its pages, this would have been of minor importance if breeders were not cognisant of the value of



the racing calendar, and had not constantly referred to it for guidance in the selection of matrons and sires for their studs. Unlike other animals, whose merits, as gauged by judges in the show ring, are a mere matter of opinion, the thoroughbred horse's worth is a matter of fact, for it is determined at the winning post.

The history of the thoroughbred horse dates back for some centuries. The Saxon era witnessed the first introduction of Eastern blood into England, and the regular, though intermittent, supply of this purest strain (which was kept up till about the middle of the eighteenth century) constituted the most important factor in the development of the breed.

It should be noted, however, that while it is proper to acknowledge the great importance of the introduction of Eastern blood, it would probably be incorrect to assert that the natural suitability of our soil for the evolution of light horses remained dormant till the advent of Eastern blood.

The thoroughbred horse owes much to the fostering influence of the English kings, who not only kept special

**The Breeding of** studs, but were instrumental in introducing  
**Thoroughbreds in** fresh blood. William the Conqueror brought  
**England.** to England a large supply of Spanish horses  
 which he used for cavalry. These were

mostly stallions and of small type. Henry I. imported Arab stallions, as did King John to a much larger extent. The latter king is credited with having taken a keen interest in running horses, and with having kept large studs. The extended use of gunpowder for purposes of war in the time of Elizabeth neutralised the advantages of heavy armour, and did much to encourage the breeding of light horses for use in war. During Elizabeth's reign, racing made rapid strides. The establishment of Newmarket races, in the reign of James I., marks the commencement of racing, as we know it, in England. King James, indeed, is credited with being a sportsman from his childhood; and during his time racing was very common in Scotland, consequent on the number of fast horses which were cast on the coast of Scotland during the wreck of the ships of the Armada. King James established a breeding stud at Newmarket, and was an importer of Eastern horses.

At some later period several Eastern sires, which have left a distinct impression on the thoroughbred horse, were introduced into England. Three of these are especially worthy of note. The Byerley Turk was brought to England in the reign of William III.



V.—Thoroughbred Stallion.



VI.—Thoroughbred Stallion.

He was imported by Captain Byerley, who used him as a charger in William's army during the Irish campaign. He was present at the battle of the Boyne, and when put to the stud he became the founder of one of the three great families of thoroughbreds, the family known as the line of Herod. Herod was a great-great-grandson of the Byerley Turk, and from him have sprung in direct descent such notable celebrities as Lexington, Flying Dutchman, Thormanby and Sweetmeat.

During the first decade of the eighteenth century, in the reign of Queen Anne, a Mr. Darley, of Yorkshire, imported, with the help of his brother, who was a "foreign merchant," an Arabian horse, subsequently known as the Darley Arabian. This horse was the sire of Flying Childers, and Bartlett's Childers, from the latter of which came in direct male descent the famous Eclipse. Through Eclipse, the Darley Arabian founded the greatest line of English thoroughbreds, which includes numerous famous sires, such as Irish Birdcatcher, Touchstone, Harkaway, Blacklock, Sheet Anchor, and Liverpool.

The third great family of English horses was founded by the Godolphin Arabian. He was the grandsire of Matchem, from which horse the family takes its name. This family is fast passing away, being practically confined to the descendants of Melbourne. It has, however, special claims on the affection of Irish breeders, as to it belong Solon, and his descendants—Arbitrator, Kilwarlin, Barcaldine, and Winkfield. From these three great sires—Herod, Eclipse, and Matchem, the thoroughbred horses now found in Great Britain and Ireland have descended.

From the evidence of cave-remains we know that a Wild Horse inhabited Ireland along with the Mammoth,

**The Early History** Reindeer, and other animals now extinct.  
**of Horse Breeding** These early horses were used as food by  
**in Ireland.** prehistoric Man. It is said that domestic

horses were probably first introduced into Ireland long before the Christian era. Owing to the close relations which existed from early times between Spain and Ireland, there were constant importations of Spanish horses into this country. In early Ireland there was very little tillage. The care of the large flocks and herds, with which the country was covered, demanded the services of a light, active, and enduring horse. Never-ending wars necessitated the use of a similar animal suitable for carrying the lightly equipped clansman in battle. These facts,

coupled with the roving disposition of a race naturally given to horsemanship, resulted in the production of the animal known as the Hobby or Hobbie. This name was possibly suggested by the light, short, hobbling action, so characteristic of the breed. The Hobbie must be regarded as a purely Irish product, evolved—partly from Spanish blood—by the influence of the Irish soil and climate in conjunction with the necessities of the time. The Hobbie was regarded very highly, at this time, in England and on the Continent. Historical records chronicle numerous exportations of Hobbies to England, Spain, and Italy. These countries were more abundantly supplied with Eastern horses than Ireland could have been, but the especial adaptability of this country for the production of light horses, as shown by the evolution of the Hobbie, points to its great superiority for the development of a breed of this type.

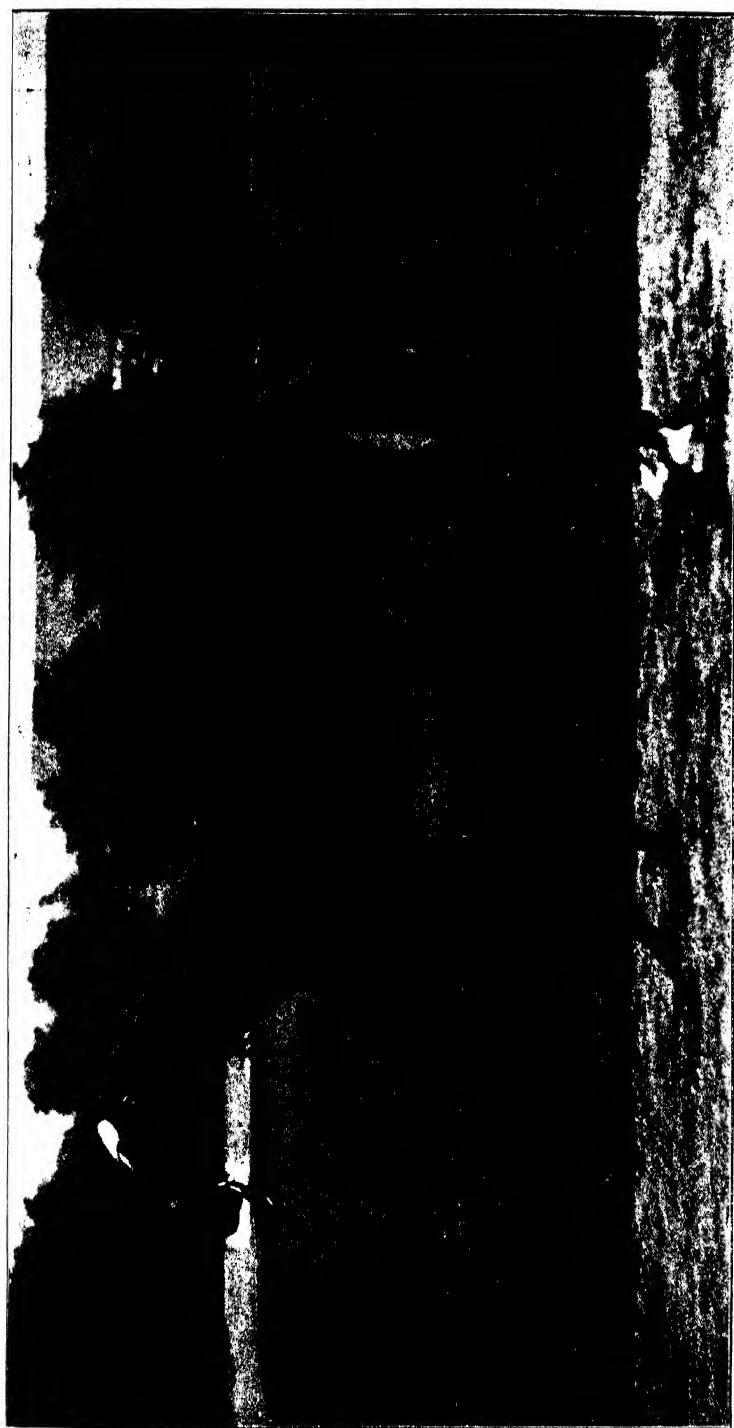
About the commencement of the seventeenth century the Hobbie began to lose ground. The constant wars

**Later-development  
in Irish Horse  
Breeding.**

which raged in Ireland at this time interfered with the care and attention which were required to maintain the type, while the introduction of the penal laws

did much to discourage horse-breeding. About the end of the eighteenth century a number of stallions of Eastern blood were introduced from England. These, crossed with the native mares, formed the parent stock of the Irish thoroughbred, the breeding of which may be said to date from this time. During the eighteenth century racing became very general in Ireland, and at one time as many race meetings were held as at the present day. Amongst the most notable of these were The Curragh, Maryborough, and Kilcock. In this way attention was directed to thoroughbred horses: the breeding of them received special attention, and valuable animals were frequently imported from England. Amongst these latter were Othello, Merry Andrew, Bustard, Hobgoblin. About the middle of the eighteenth century upwards of a hundred imported stallions were standing in Ireland. From this time the history of the thoroughbred horse in England and Ireland is practically the same.

In the friendly rivalry which has existed between England and Ireland in the production of thoroughbred horses, Ireland has laboured under the disadvantage of poverty. But notwithstanding the small number of thoroughbred mares employed, and the inferiority of many of the stallions, the pre-eminent natural advan-



VII.—Thoroughbred Brood Mare.



VIII.—Thoroughbred Yearling Filly.

tages of the country enabled her to secure a reputation as a producer of high-class thoroughbreds. The name of Harkaway is to be found in most good pedigrees of the present day; while Sir Hercules, who stood in Co. Meath, begot Faugh-a-Ballagh and Irish Birdcatcher, whose name and fame are well known to all lovers of the race-horse. In more recent years, Solon and Barcaldine helped in a large measure to maintain the reputation of our horses, while during the last decade the advent of Galteemore, Ard Patrick, and Pretty Polly has convinced all observers of the unequalled suitability of this country for breeding thoroughbred horses.

The first authentic reference to the Irish draught-horse must date from the close of the eighteenth century.

### **The Irish Draught Horse.**

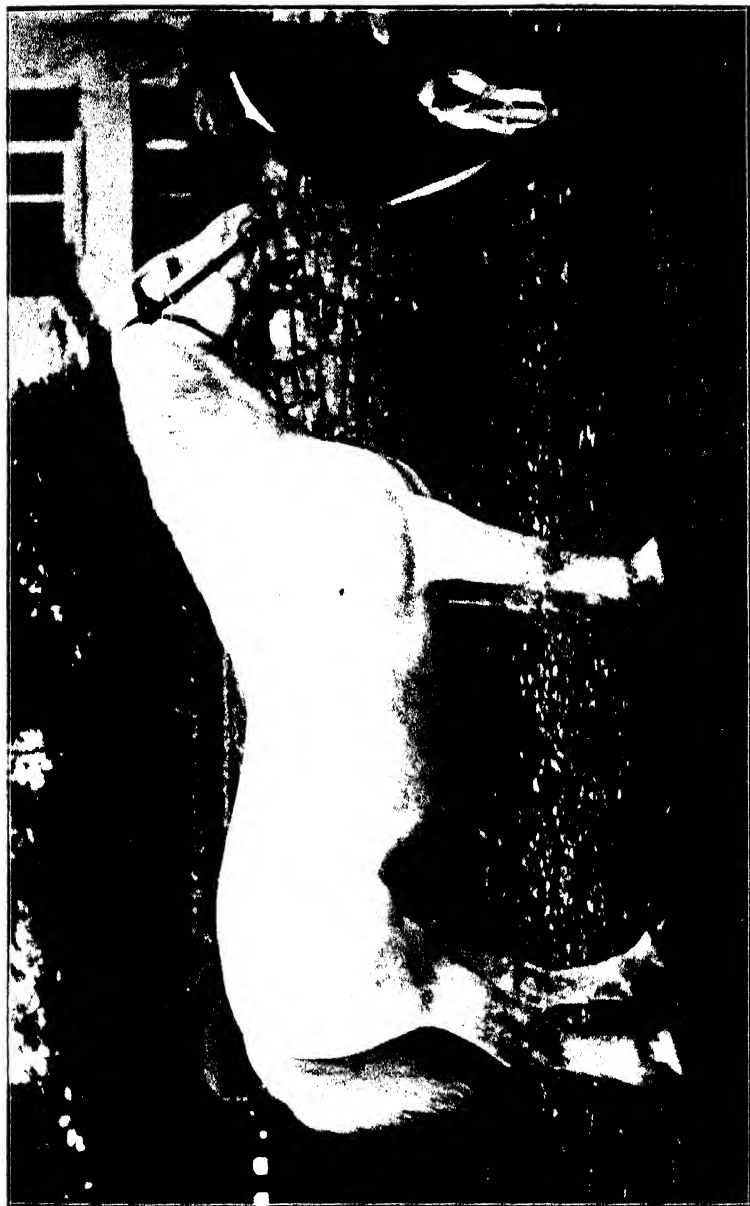
At that time a very great increase in the area of land under tillage took place, and this created a demand for a bigger, stronger, and more docile horse, than was required when the land was chiefly devoted to the rearing of flocks and herds. Though there are historical references to the importation of draught-horses from England to meet this demand, there are reasons for believing that these horses failed to serve the purpose for which they were intended. The prejudicial influence of the cross of the heavy English draught on the Irish horse seems to have been recognised even at this early period. The cross was found unsuitable, and the effort to effect a change in this way was abandoned. The people were, therefore, compelled to rely on the selection of the heavier of their native horses for the production of animals of a type suited for farm work. The animal produced in this manner must have been a farm horse of good quality, for he filled that position when Ireland was largely engaged in tillage; he was also a harness horse of sufficient merit to suit the requirements of a farming population; and though too coarse for hunting he had a natural liking for the game, as shown by his high spirit and the readiness with which he took to jumping. The most valuable and prominent characteristic of the Irish draught-horse was his suitability for mating with the thoroughbred. To this cross we owe the Irish hunter, which has established for Ireland a world-wide reputation.

During the past fifty years Irish draught-horses have steadily decreased in number and quality; at the present moment they have almost disappeared. The increase of tillage at the close of the eighteenth century was mainly responsible for their evolution; its regrettably large decrease especially during the last twenty-five years



is mainly responsible for their present scarcity. The decrease in the area under tillage began on the large farms of the country, and by degrees the draught-horses passed almost exclusively into the hands of the smaller farmers. The agricultural depression which set in about 1879, and which has continued up to the present time, so crippled these small farmers that they were compelled to part with their good colts and fillies, to meet the urgent calls made on them. Consequently, after a drain of twenty-five years, we have left only some very old and degenerate specimens of a very valuable breed. This must be regarded as a national loss. The great demand for Irish hunters, and their increasing value, as years passed by, resulted in their widespread and general production. Given the Irish draught-mare to mate with the thoroughbred horse, hunter-breeding was simplicity itself. But when breeders were compelled to couple the thoroughbred sires with mares possessed of two or more crosses of thoroughbred blood the result was by no means so certain. The hunter being a cross-bred animal, it is obvious that the maintenance of a definite type depended largely on the balancing of the two factors which produced him. But breeders were compelled, owing to the disappearance of the old draught type, to rely more and more on thoroughbred blood. It is true that the best and most valuable hunter is the thoroughbred hunter; but the production of animals of this class is so very uncertain that it can never be recommended for general adoption.

<p>The disappearance of the Irish draught-horse left the small farmer and the hunter breeder with a common grievance: the one required an animal suitable for his farm work, the other needed something to give more bone and size to his brood mares. This led to the introduction of English and Scotch draught-horses. The experience of the past fifty years affords convincing proof of the failure of these breeds to fulfil the objects for which they were introduced. It is true that they have afforded temporary relief to the small farmer in some parts of the country, but their use in the production of hunters is not commendable from any standpoint. Why is this? The answer is that the Shire and Clydesdale differ so widely from the thoroughbred in conformation, temperament and breeding that it is impossible for the two types to be ever successfully interbred.</p>	<p>Attempts to replace the Draught-horse by other Breeds.</p>
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IX.—Irish Draught Stallion.



The Shire is particularly characteristic of England; he is the lineal descendant of the old war-horse or Great Horse. In the early ages, and up to the reign of Elizabeth, he was principally used in war. Since that time he has played a useful part in the agricultural world, and of late years has been extensively employed in the heavy goods traffic of the large cities. Though the Shire and Clydesdale are descended from a common ancestor, there are distinctive differences between the two breeds—largely due to the influences of environment and food. Their main points of difference consist in the extra size of the Shire (a characteristic which some assert is still on the increase) as compared with his Scotch neighbour. He stands rather straight on his legs, which are covered with an enormous growth of hair; his pasterns are somewhat short, and he is often found with small weak feet. The Clydesdale, smaller than the shire, is thought to be getting smaller. He is scarcely so well topped; but his legs are, as a rule, "cleaner"; his pasterns are longer and more elastic, and he has much better feet.

The Shire and Clydesdale were always beasts of burden, and were used for slow work. First used as war horses, they carried soldiers who, when fully equipped, weighed about four hundred-weight each. Subsequently, on the farm and in the large cities, they were accustomed to slow movement and to drawing heavy loads. They are very big, tend to grow coarse and to put on fat, are soft in their bones, and sluggish in temper. They require large quantities of soft food, and are unable to withstand privation. Their anatomical formation and sluggish disposition render them unsuitable for work demanding quick movement.

Do any of the attributes of the Shire or Clydesdale as here enumerated help in the production of a hunter? The reply must be, only their strength. But this strength is combined with such a number of other wholly unsuitable qualities as to neutralise its merit.

The thoroughbred is in every point of temper, conformation, and habit the exact opposite of those breeds, so that the cross between them is too violent, the points of similarity too few, to warrant anyone in recommending it in the face of the teaching both of science and of experience.

Reverting to the statement on the opposite page, that the Irish draught-horse and the thoroughbred are best suited for the production of hunters in Ireland, it becomes necessary to consider what steps are expedient for their development. The thoroughbred may be safely left to the

protection of the racing calendar and stud book. The Irish draught-horse meets the horse-breeding needs of the present hour. He is himself sufficient to do the work of the farmer, and when crossed with the thoroughbred he supplies us with hunters and harness horses. Unfortunately, the Irish draught-horse has almost disappeared. But a consideration of the circumstances under which he was originally produced warrants us in concluding that his restoration is quite within the range of earnest effort. The Irish draught-horse was produced by careful selection amongst the horses found in this country at the close of the eighteenth century. These were the descendants of the Hobbies which were the direct descendants of the native horse crossed judiciously with Eastern blood. At the present moment there is plenty of a similar material, only requiring a careful process of selection, and the establishment of a stud-book. Unfortunately, there has been distributed through our horses a considerable quantity of Shire and Clydesdale blood, which has been shown to be injurious. While it would now be impossible to entirely exclude this, every precaution should be taken to avoid it. A lesson may be learned from the manner in which the various English breeds have been improved within quite recent times by the establishment of stud books and the foundation of special societies. Careful selection, intelligent breeding, and proper feeding were encouraged and rewarded, and the result is seen in the prosperous position of all English breeds of live stock at the present moment.

There is no stud book; no national or local societies to concern themselves with the well-being of our most valuable native breed: the result is obvious and lamentable.

The improvement of the Irish draught-horse is a question of national concern, for, on his restoration, the entire horse-breeding industry of the country in a great measure depends. This became very evident some years ago, and in the absence of national effort the Government were compelled to take the initiative. In 1888, the Government decided on making an annual grant of £5,000 for the improvement of Irish live stock, and entrusted the administration of this sum to the Royal Dublin Society. The Society allocated £3,200 for horse breeding, which was entirely devoted to the provision of premiums for thoroughbred stallions. These were dis-





XI.—Irish Hunter Gelding.

tributed through the country in accordance with local requirements. This system was continued from 1888 to 1891, when the payment of premiums was discontinued and the money devoted to the provision of free, or assisted, nominations for mares. The system of nominating mares continued from 1892 to 1900, inclusive. In connection with this system of free nomination there was formed a register of thoroughbred stallions serving in Ireland. Only animals considered sound and suitable were placed on this list: they alone could be selected for mares receiving nominations. The first stallion register was formed in 1892, and the following list shows the number of horses on the register during each of the years from 1892 to 1900 :—

—	YEAR.								
	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
No of Horses. .	101	119	105	219	239	212	217	206	201

In forming its stallion register during the years 1892-1900 the Royal Dublin Society depended mainly on private enterprise for animals to fill its list.

In 1900 the Department of Agriculture took over this duty. In conducting this important work the Department proceeded on the lines laid down by the Royal Dublin Society. They were guided by a committee of experts—the “Horse-breeding Committee”—representing the various horse-breeding interests in Ireland. Every year the Department applies to the various County Councils for suggestions as to future work. With more ample funds, and with the excellent machinery which the present system of local government affords, at their disposal, they are able to conduct this work on a larger scale than the Royal Dublin Society could.

In the working of the horse-breeding scheme of the Department it was soon found that private enterprise did not suffice to supply the great need of fresh blood in the country. The Department, therefore, found it necessary to undertake the purchase of suitable stallions, and to offer them for sale to suitable applicants on easy terms. In order to satisfy the pressing demands of the small farmer, who was left in a parlous plight owing to the decadence of the Irish draught-horse, the Department were forced to fall back



on the Clydesdale and Shire breeds. Sires of these breeds were admitted to the register, and as might be expected, the innovation excited a considerable amount of hostile criticism. The objections to the introduction of these breeds which we have already stated were felt and expressed widely throughout the country. They did not find much favour with the small farmer, who only used them as a last resource; they were positively objectionable to the larger farmers, who felt that their introduction meant the ruin of the Irish hunter. This induced a re-consideration of their further use, and in 1903 the Department decided to restrict considerably the area within which they should be used.

It then became obvious that the districts from which they were excluded required a horse other than the thoroughbred, and the efforts of the Department are now being directed to the supply of this want.

It is known that of the 2,400 stallions standing in Ireland about 30 per cent. are pure-bred animals. Of these and their progeny a reasonable estimate can be formed, but of the remaining 70 per cent., known as half-breeds, no definite information is available.

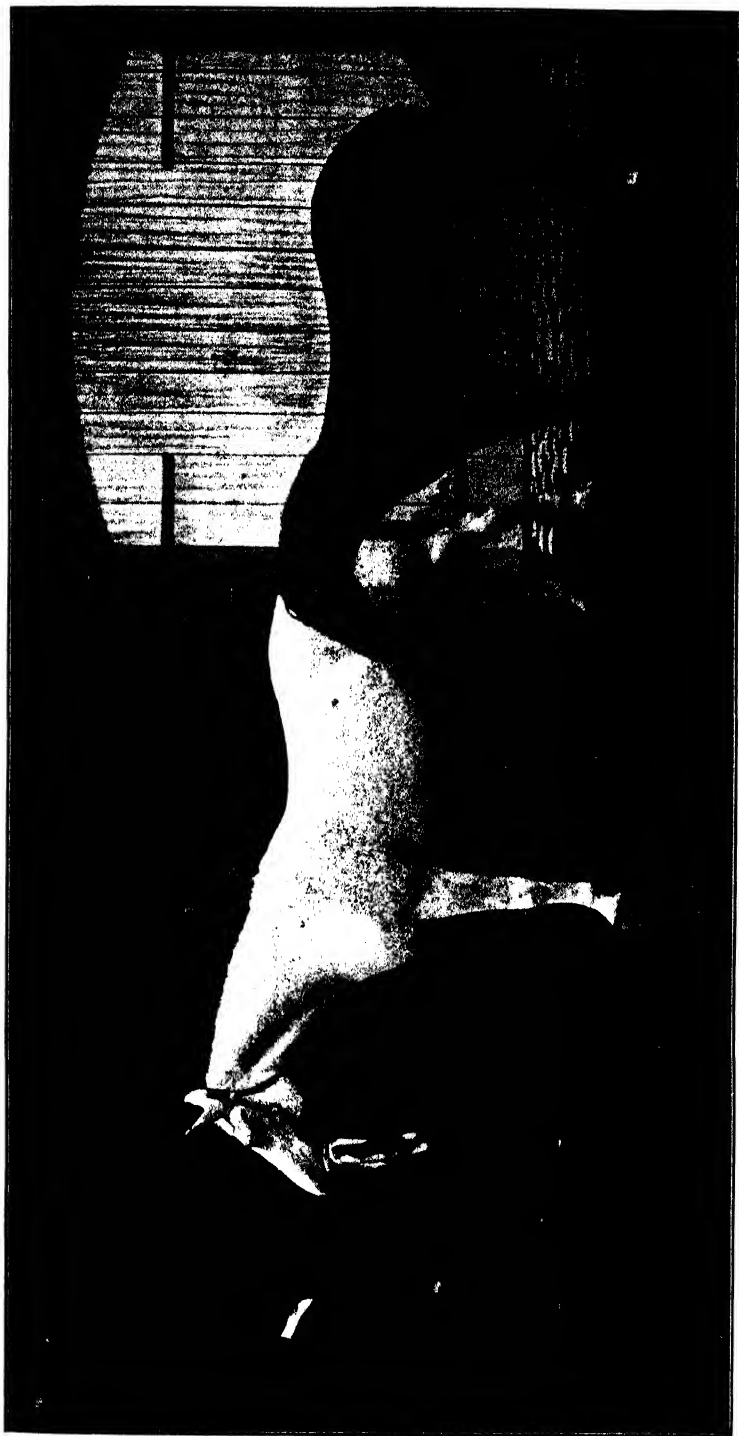
The Department instituted an enquiry into the breeding and merits of these half-breeds, and a circular was issued informing stallion owners that exhibitions of half-bred sires would be held in the different counties. The following is the report of the Inspector who carried out the enquiry:—

#### REPORT.

"In response to the circular issued by the Department replies were received from the owners of 494 horses. The owners were fairly evenly distributed over the country, though a slight deficiency in parts of Ulster had to be set against the larger number in the counties Wexford and Waterford.

"The following is a tabulated list of the exhibitions for the examination of half-bred sires which were held in the different counties:—

Centre.	County.	Centre.	County.
Mullingar, ..	Westmeath	Tullamore, ..	King's Co
Streamstown, ..	"	Edenderry, ..	"
Granard, ..	Longford	Athy, ..	Kildare
Longford, ..	"	Sallins, ..	"
Elphin, ..	Roscommon	Ballymoney, ..	Antrim
Athlone, ..	"	Ballymena, ..	"
Castlereagh, ..	"	Larne, ..	"



XII.—Hunter Brood Mare and Foal.



XIII.—Three-year-old Gelding (Half-bred).

## TABULATED LIST—continued.

Centre.	County.	Centre.	County.
Magherafelt, ..	Londonderry	Thurles, ..	Tipperary
Moville, ..	Donegal	Fethard, ..	"
Milford, ..	"	Cahir, ..	"
Strabane, ..	Tyrone	Adare, ..	Limerick
Fintona, ..	"	Newcastle West, ..	"
Augher, ..	"	Listowel, ..	Kerry
Armagh, ..	Armagh	Tralee, ..	"
Crossmaglen, ..	Monaghan	Farranfore, ..	"
Castleblayney, ..	"	Killarney, ..	"
Comber, ..	Down	Woodenbridge, ..	Wicklow
Crossgar, ..	"	Newtownmount-	"
Hilltown, ..	"	kennedy, ..	"
Dundalk, ..	Louth	Borris, ..	Carlow
Drogheda, ..	"	Carlow, ..	"
Summerhill, ..	Meath	Tullow, ..	"
Kells, ..	"	Balbriggan, ..	Dublin
Oldcastle, ..	"	Gorey, ..	Wexford
Virginia, ..	Cavan	Enniscorthy, ..	"
Bailieboro', ..	"	Wexford, ..	"
Cootehill, ..	"	New Ross, ..	"
Maguiresbridge ..	Fermanagh	Mullinavat, ..	Kilkenny
Enniskillen, ..	"	Ballyragget, ..	"
Manorhamilton, ..	Leitrim	Kilkenny, ..	"
Mohill, ..	"	Kilmacthomas, ..	Waterford
Collooney, ..	Sligo	Dungarvan, ..	"
Dromore W., ..	"	Cappoquin, ..	"
Sligo, ..	"	Fermoy, ..	Cork
Ballina, ..	Mayo	Mallow, ..	"
Killala, ..	"	Blarney, ..	"
Balla, ..	"	Cork, ..	"
Claremorris, ..	"	Midleton, ..	"
Shrule, ..	"	Bandon, ..	"
Tuam, ..	Galway	Dunmanway, ..	"
Craughwell, ..	"	Skibbereen, ..	"
Gort, ..	"	Leap, ..	"
Galway, ..	"	Banteer, ..	"
Moycullen, ..	"	Killaloe, ..	Clare
Maryborough, ..	Queen's Co.	Ennis, ..	"
Templemore, ..	Tipperary	Tulla, ..	"
Roscrea, ..	"	Kilrush, ..	"
Nenagh, ..	"	Miltown-Malbay, ..	"

Number of Sires entered, . . . . .	494
Number of Sires inspected, . . . . .	367
Inspection for general merit—	
Rejected, . . . . .	353
Passed, . . . . .	14
	— 367
Examination for soundness—	
Not examined owing to frost, . . . . .	30*
Passed sound, . . . . .	251
Rejected, . . . . .	86†
	— 367
Result—	
Passed, sound and suitable, . . . . .	12

\* Did not include any having sufficient general merit.

† Including two which had sufficient general merit.

"From the annual statistics published by the Department it appears that the total number of sires standing in Ireland is 2,424. Assuming that 400 of these are thoroughbreds, and that 300 represent the aggregate of all other pure breeds, there remain 1,724 stallions which come under the heading 'Half-bred.' I am convinced that in the 367 animals which have been inspected we have the pick of Ireland's half-bred sires. No stallion was shown whose owner did not expect a certificate of approval; hence the doubtful ones were left at home.

"It seems incredible that out of a total of 1,724 sires only twelve meritorious animals could be found. Such a state of affairs existing in a country remarkable for its horses passes conception. It can hardly be attributed to want of judgment on the part of breeders. Perhaps the exceptional suitability of our soil for the raising of horses, and its wonderful effect in bringing forth good animals from indifferent parents have made the Irish farmer negligent of the other factors which, under less favourable conditions, are essential to success. Though soundness and conformation are very important factors in the constitution of a sire, there are reasons for holding that breeding is of still greater moment. Since breeding consists in the condensation in an animal of a capacity to reproduce certain characteristics, the particular type of animal which breeders should aim at producing should be defined before his evolution is set about.

"The introduction of the Shire, Clydesdale, Hackney, Cleveland Bay, Suffolk Punch, &c., during the past thirty years, has rendered the breeding of a good half-bred sire a mere matter of accident. Heretofore, the Irish half-bred sire consisted of a blend in varying proportions of two strains of blood, viz., the Irish draught-horse and the thoroughbred; both were desirable factors in our equine industry: they blended together successfully, hence our country became famous for its horses. The introduction of those other breeds for crossing purposes and the aimless manner in which they have been used, have resulted in the chaotic state in which we now find ourselves with 1,724 half-bred sires containing only twelve animals of merit!

"I do not mean to deprecate the use of the above-named breeds, but I am convinced they are only suited to breed to themselves, or, in the case of the Shire and Clydesdale, to each other. They hold no advantageous place in the production of our hunters, harness horses, or Irish farm horses.

"The breeding of the 367 horses inspected was a difficult matter to unravel. In the application forms supplied by their owners a pedigree was in most instances attached. This was not always reliable, while it often formed an unknown quantity. Taking into consideration all the evidence at my disposal, together with the appearance of the animals inspected, I have pitched on the following classification in so far as the male side of their progeny are concerned:—

" Got by Thoroughbred sires,	.	.	.	133
„ Shires and Clydesdales,	.	.	.	98
„ Half-breds,	.	.	.	125
„ other breeds,	.	.	.	11."

This report shows that of all the half-bred stallions examined only twelve were considered suitable for

**Conclusion.** the improvement of our Irish horses. This strengthens the argument already urged, that the old Irish draught-horse is an absolute necessity in our horse-breeding industry; and that no animals bred without system, or as the result of "happy accident," will suffice to meet the needs of the Irish farmer and hunter breeder.

It is surprising that the obvious merits of the old Irish draught-horse and the urgent need which exists for the breed in the country, should have been overlooked so long. Fifteen years ago Irish draught-horses of good quality were comparatively numerous, and if the proper steps had then been taken Ireland might now be in possession of a distinct breed of this type. Immediate steps should be taken to re-establish this breed. The urgent needs of the hour, the increase in the amount of tillage which may reasonably be expected to follow the settlement of the Land Question, and the greater attention which is now being devoted to the live stock of the country, will tend to help forward this good work.

## AGRICULTURAL CO-OPERATION IN GERMANY, 1903-4.\*

The *Raiffeisen* organisation (permanent headquarters Neuwied)—(*Generalverband ländlicher Genossenschaften für Deutschland*)—held its annual general meeting at Potsdam on June 8th, 1904.

The *Reichs-Verband* (permanent headquarters Darmstadt) held its annual general meeting at Posen on the 18th and 19th of August, 1904.

The *Allgemeiner Verband deutscher Erwerbs-und Wirthschaftsgenossenschaften* (Schultze-Delitsch organisation) held its annual general meeting at Breslau on the 24th and 25th of August, 1904.

These organisations all sent representatives to the International Co-operative Congress held at Buda-pesth on September 5th to 8th, 1904.

The latter meeting is, however, outside the scope of these notes.

The meeting of the *Raiffeisen* organisation was presided over by Herr Kaulen, Chairman of the Council of Control (*Aufsichtsrath*).

Suitable expression having been given to the feelings of the meeting with regard to the great loss the organisation had suffered by the premature death of the late general director, Dr. Heller, the new general director appointed by the Council of Control, on the recommendation of the Committee of Management, Herr Caspers, presented the report, which showed that at the end of 1903 the organisation comprised 4,243 co-operative societies, consisting of 3,749 *Raiffeisen* societies (*i.e.*, savings and loan societies mostly doing business in agricultural requisites), and 494 productive societies. The organisation had in its employment 340 officials and 220 artisans (printers, &c.) and other workmen.

### RECEIPTS.

The *General-Verband* received from the societies in round numbers:—

Fixed annual contributions,	86,953 marks (£4,347)	
Percentages on profits,	24,012 „	(£1,200)
Extra inspection costs,	28,534 „	(£1,426) = 139,498 marks (£6,975)
Other receipts—subsidies from Public bodies, profits on insurances, profits on <i>Raiffeisen-</i> <i>boten</i> , etc., . . . . .	164,390 „	(£8,219)
<b>Total receipts,</b> . . . . .	<b>303,888 „</b>	<b>(£15,194)</b>

\* See *Journal*, Vol. IV., No. 2, p. 214.

## EXPENDITURE.

Salaries, . . . . .	178,623 marks (£8,931)		
Travelling Expenses—			
Members of Committees,			
&c., . . . . .	16,658 marks (£833)		
Officials, . . . . .	69,159 „ (£3,458)		
		85,817 „	(£4,290)
Other expenses (rent, fuel, carriage, printing, etc.), . . . . .		143,109 „	(£7,155)
Total expenditure, . . . . .		407,552 „	(£20,377)
Excess of expenditure over receipts, . . . . .	103,663 „	(£5,183)	
Reduced by balances from last year to . . . . .	86,283 „	(£4,314)	
Of which the Central Financial Society paid . . . . .	36,565 „	(£1,828)	

The rest being carried forward.

## INSPECTION.

All societies are inspected at least once in twenty-four months, as many as possible once in twelve months.

Two thousand eight hundred and fifty-eight societies were inspected in 1903.

At the end of 1903 fifty-one inspectors (*Revisoren*) were at work in the organisation. 161 second inspections were held by the twelve branch secretaries who act as head inspectors. All the inspectors are expected to act as advisers to the central and branch administrative officers and committees, and not merely as reporting inspectors.

## PRESS DEPARTMENT.

The organ of the Verband—the *Genossenschaftsblatt* has changed its policy in so far as it now replies to attacks on the organisation, and on the movement generally, by outsiders, whereas it formerly ignored them.

Measures have also been taken to get replies inserted in other newspapers. The Department watches 150 newspapers and periodicals with this view, and the committees of local societies and groups of societies have been urged to watch the local papers, and send articles requiring notice or reply to the central press department of the organisation.



The circulation of the *Genossenschaftsblatt* (the central organ of the *General-Verband*) at the end of 1903 was 11,636 copies—1,636 more than last year. The *Raiffeisenboten* (the smaller papers issued separately in each province or district) had a collective circulation of 108,168 in the twelve provinces or districts into which the sphere of action of the Raiffeisen organisation is divided.

A number of pamphlets on co-operative and agricultural subjects were also issued or re-issued.

The press department comprises a legal bureau to watch and give information as to law points affecting co-operative societies and to recommend amending legislation when necessary.

Enquiries have been conducted as to undertakings for the promotion of the general moral and material welfare of the rural population, in connection with Raiffeisen societies.

Three hundred and fifty-one undertakings of this kind are conducted by the societies within themselves—they are chiefly penny banks (*Pfennig sparkassen*—a pfennig is about  $\frac{1}{3}$ d.), burial societies, Raiffeisen evenings, society libraries, parish halls, poor relief, medical relief, cattle insurance. 1,700 undertakings outside the societies receive subsidies from them. These are chiefly village libraries, nursing associations, penny banks, public nurseries, continuation schools.

#### INSURANCE DEPARTMENT.

For various branches of insurance special arrangements have been made with five different strong German and Swiss insurance companies. The business is done through the insurance department of the organisation. 88,603 marks (£4,430) was paid in premiums in 1903—about 7,000 marks (£350) more than in the previous year.

#### PRINTING DEPARTMENT.

The Raiffeisen printing press issued books, forms, *Genossenschaftsblätter* (central papers), *Boten* (district papers), almanacks, &c., during 1903 to the value of 276,924 marks (£13,846)—40,000 marks (£2,000) more than the previous year.

The profits from the printing press all go to a pension fund for officials of the organisation, which now amounts to 298,385 marks (£14,919).

## GENERAL STATISTICS.

These comprise a collective statement of the receipts and expenditure of the affiliated societies under separate heads, and a balance sheet with particulars:—

	Marks.	£
The total receipts under all heads amount to .	289,916,481	(14,495,824)
The total payments under all heads amount to .	277,339,967	(13,866,998)
<hr/>		
Total turn-over, . . . . .	567,256,448	(28,362,822)
<hr/>		
Net cash balance at end of year, . . . . .	12,576,514	(628,825)
Net profit, 1,135,742 marks (£56,787).		

The total number of members of the 3,375 societies was 310,676. The total population of the districts in which they operated was 7,137,677.

Advances on loan were made:—

	Marks.	£
a. For 1 year or less, to the amount of . . . . .	12,900,346	(645,017)
b. For more than one year and less than 10 years, . . . . .	115,233,247	(5,761,662)
c. For more than 10 years, . . . . .	32,978,228	(1,648,911)
d. To be discharged by equal payments, capital and interest, . . . . .	6,395,405	(319,770)
<hr/>		
Total, . . . . .	167,507,227	(8,375,361)

Advances on loan were made:—

	Marks.	£
a. Secured by sureties to 207,654 borrowers of . . . . .	96,111,807	(4,805,590)
b. Secured by mortgage to 63,853 borrowers of . . . . .	68,085,936	(3,404,296)
c. Secured by deposit of scrip, &c., to 3,337 borrowers of . . . . .	3,309,483	(165,474)
<hr/>		
Total, . . . . .	167,507,227	(8,375,361)

Advances on loan were made:—

a. For land improvement, 7,487 loans, amounting to	3,498,320 marks	(£174,916)
b. For purchase of cattle, 26,641 loans, amounting to	7,732,606 „	(386,630)
c. For building, 32,410 loans, amounting to	30,233,568 „	(1,511,678)
d. For purchase (of land?), 71,137 loans, amounting to	39,996,415 „	(1,999,820)
e. For other purposes, 95,768 loans, amounting to	59,482,442 „	(2,974,122)

51,261	advances on loan were made for sums of .	£5 and under
94,296	„ „ „	£5 to £15
49,093	„ „ „	£15 to £25
42,732	„ „ „	£25 to £50
23,955	„ „ „	£50 to £100
13,420	„ „ „	£100 to £250
3,648	„ „ „	over £250

The largest loan ever advanced to any one member was 90,000 marks (£4,500).

The turn-over on current account with 30,658 members was 85,660,177 marks (£4,283,008).

The rates of interest paid by societies for deposits varied from 3% to 5%—the large majority of societies paying  $3\frac{1}{2}\%$ ,  $3\frac{3}{4}\%$ , and  $4\%$ — $3\frac{1}{2}\%$  being the commonest figure. The rates of interest charged for loans varied from  $3\frac{1}{2}\%$  to 6%—the large majority of societies charging  $4\%$ ,  $4\frac{1}{4}\%$ ,  $4\frac{1}{2}\%$ ,  $4\frac{3}{4}\%$ , or 5%— $4\frac{1}{2}\%$  being the commonest figure.

## CENTRAL CREDIT AND SUPPLY INSTITUTION.

(Landwirthschaftliche Central-Darlehns-Kasse.)

The accounts of this institution were presented as follows:—

### BALANCE SHEET FOR 1904.

	Marks.	£
<i>Assets.</i>		
Cash in hands of Central Institution and Branches . . . . .	1,015,411	(50,770)
Current accounts, sundry debtors to Central and Branches . . . . .	56,788,252	(2,839,412)
Valuation of wares in stock, Dec. 31st. . . . .	2,105,602	(105,280)
Valuation of packages, &c. „ . . . .	81,124	(4,056)
Valuation of machinery, &c. „ . . . .	75,153	(3,757)
Valuation of buildings, &c. „ . . . .	829,339	(41,466)
Valuation of furniture, &c. „ . . . .	180,531	(9,026)
Negotiable bills . . . . .	1,359,268	(67,963)
Sundry securities . . . . .	1,764,750	(88,237)
Deposits in the <i>Reichsbank</i> . . . . .	34,232	(1,711)
Shares in Co-operative Societies and Companies . . . . .	578,390	(28,919)
	64,812,056	(3,240,602)

*Liabilities.*

	Marks.	£	Marks.	£
Share capital . . . . .	8,200,000	(410,000)		
Calls still to pay . . . . .	25,000	(1,250)		
Paid-up share capital . . . . .			8,175,000	(408,750)
Current account—sundry creditors . . . . .			51,970,525	(2,598,526)
Balance due to the Prussian (Government) Central Co-operative Bank on current account . . . . .			2,240,000	(112,000)
Balance due to the Prussian (Government) Central Co-operative Bank on "Iombard" account . . . . .			1,627,900	(81,395)
Sundry accounts . . . . .			51,912	(2,595)
Mortgage on a corn store at Grimmenthal . . . . .			25,000	(1,250)
Statutory 20% of gross profits payable to reserve fund . . . . .			480,970	(24,048)
Net profit for 1903 . . . . .			240,747	(12,037)
			<hr/>	<hr/>
			64,812,056	(3,240,602)

*Profit and Loss Account.*

	Cr.	Marks.	£
Loss on sundry securities . . . . .		14,861	(743)
Depreciation on furniture, &c., 10% . . . . .		17,612	(880)
Depreciation on packages, &c., @ 20%, 25%, 33½% . . . . .		30,447	(1,522)
Depreciation on buildings and land, 1% . . . . .		3,775	(188)
Depreciation on machinery, 10% . . . . .		8,067	(403)
Sundry rents . . . . .		11,366	(568)
Refunds on wares (Art. VIII., 47 of rules) . . . . .		15,000	(750)
Expenses of administration . . . . .		778,697	(38,934)
Share of costs of <i>General-Verband</i> for inspecting and looking after societies . . . . .		36,565	(1,828)
Bill stamps . . . . .		510	(25)
20% of gross profit placed to reserve . . . . .		60,186	(3,009)
Net profit for 1903 at the disposal of the general meeting . . . . .		240,740	(12,037)
		<hr/>	<hr/>
		1,217,839	(60,891)

*Dr.*

	Marks.	£
Balance from 1902, . . . . .	4,378	(218)
Surplus interest on current accounts, etc. (central and branches—money and wares), . . . . .	378,934	(18,946)
Commission on current accounts, . . . . .	156,042	(7,802)
Gross profit on sales of wares, . . . . .	676,496	(33,824)
Dividends from shares held in societies, etc., . . . . .	1,987	(99)
	<hr/>	<hr/>
	1,217,839	(60,891)

	Marks.	£
The cash turnover of the Central Institution in 1903 was (in round numbers)	307,000,000	(15,350,000)
The gross turnover on all accounts,	660,000,000	(33,000,000)
The corresponding numbers for 1902 were:—		
	260,000,000	(13,000,000)
	530,000,000	(26,500,000)

The collective cash turnover of the twelve branch institutions was 516,101,000 marks (£25,805,050).

In spite of the reduction of the rate of interest from 4 per cent. to 3½ per cent. the deposits increased from 44,000,000 marks (£2,200,000) in 1902, to 50,500,000 marks (£2,525,000) in 1903. As the Prussian Government Central Co-operative Bank only paid 3 per cent. on deposits, surplus deposits were invested in trustee securities which have yielded a higher rate of interest.

The rates of interest in the Neuwied central bank and its provincial branches were:—From January 1st to April 1st, 4 per cent. on deposits, 4½ per cent. on advances; since April 1st, 3½ per cent. on deposits, 4 per cent. on advances.

The subscribed share capital at the end of 1903 was 8,200,000 marks (£410,000), of which 8,175,000 marks (£408,750) was paid up.

The collective turnover of the district co-operative banks for productive societies (*Landesgenossenschaftskassen*) was 93,703,000 marks (£4,685,150).

*Note.*—The rules of the Neuwied central bank confine the membership to pure Raiffeisen societies with unlimited liability, restricted area, indivisible reserve fund, &c.—a form inconvenient in many cases for productive societies. These latter have central banks of their own, managed, however, by the same persons as are in charge of the original central Raiffeisen bank and its branches.

The dealings in goods—machines, creamery buildings, &c.—of these banks in 1903 amounted collectively to 49,759,000 marks (£2,487,950).

The chemical manure manufactory *Unitas*, which for many years was worked at a serious loss, made a small profit in 1902 and 1903.

The only point raised in discussion on the reports was that of the dividend on the shares held by the societies in the central bank. The rate is limited to 5 per cent., any profits beyond what will yield this percentage going to the benefit of borrowers and depositors. At present, however, the dividend on shares is kept down to 3 per cent. by the large subsidy required by the Central *Verband*.

The amount of credit the societies can claim from the central bank depends upon the amount of shares they hold in it. The better situated societies are able to work with their own deposits, require little or no credit from the central bank, and, therefore, hold fewer shares than the poorer societies. The system of paying a large subsidy to the *Verband* at the expense of the amount of dividend paid on the shares in the central bank results in practice in the poorer societies contributing more than their fair proportion of the cost of the *Verband*. It was decided that the *Verband* should not in future be subsidised out of the profits of the bank; but that each branch should provide for the costs of administration in its district by increasing the contributions of the societies, or in whatever way the circumstances of the district may make most convenient. A larger proportion than hitherto of the gross profits on the supply business of the central institution is also to be allocated to the payment of bonuses on custom to the branches, before striking the balance representing net profit on the whole turnover of the institution available for dividends on shares and other purposes.

A proposal was also discussed and adopted to modify the rule as to the indivisibility of the funds of societies, to meet the case of the division of the sphere of action of any district into two or more separate districts with distinct societies.

Addresses were delivered on the subject of the aims and results of Raiffeisen's efforts in the direction of promoting rural welfare generally (*ländliche Wohlfahrtspflege*) and on that of "the Raiffeisen idea." A number of letters of apology were received from Cabinet Ministers and others. The meeting was attended and addressed by Herr Regierungsrath Rötger, as the representative of the Minister of Agriculture and of the Governor of the province of Brandenburg.

The twentieth annual meeting of the *Reichs-Verband* of German agricultural co-operative societies took place at Posen on the 18th and 19th of August. There was a large attendance of delegates. Baron von Wnamowitz-Möllendorf occupied the position of honorary president of the meeting. In his opening speech he welcomed the delegates from all parts of Germany, dwelt upon the services of the agricultural co-operative movement to the province of Posen, the welfare of which depends largely on farming, and especially on the merits of the local leaders of the movement in connection with the *Reichs-Verband*—Major Endell and Oekonomierath Hünerasky.

Herr Ober, presidialrath Thon, representing the Governor of the province, v. Waldow, who was absent on leave, spoke in the same sense, expressing unreserved acknowledgment on the part of the Government of the merits of the agricultural co-operative movement. Director Zierold, of the Prussian (Government) co-operative bank (*Preussische Central Genossenschaftskasse*) having spoken, Herr Künzer, the *Bürgermeister* of Posen, addressed the meeting on behalf of the city of Posen, which, being the centre of a predominantly agricultural region, was interested in many ways in the welfare and progress of agriculture. At a time when politics were dull the conflicting interests of various branches of industry and commerce were emphasised more frequently and with more heat than in times of more general political excitement, but he (the *Bürgermeister*) was convinced that there were no economic conflicts of interest that could not be bridged over. He considered that the conflicts that had undoubtedly arisen between the interests of agriculture, commerce, and manufacture, if they could not be entirely removed, might be rounded off and mitigated. The first condition for this was a better understanding of each other's views, and he hoped that the meeting would tend to make the citizens, especially those interested in commerce and manufacture, better acquainted with the tasks and objects of the co-operative movement (applause). On the other hand, he wished the co-operative societies might carry away from this meeting the conviction that the opposition of certain branches of commerce to the co-operative movement arose out of important questions of existence, and that it was necessary to establish boundaries between the spheres of interest of each, and not to threaten the existence of trade and manufacture, where they sufficiently met public needs as at present carried on, by unnecessary extensions of co-operative operations. Both parties would come to an understanding if they would remember that the welfare of the whole community in the state stands supreme above even the most important interests of any section.

According to the established practice at these meetings the first paper read was an account of the development of the movement in the province in which the meeting was held—Posen—by the Director of the Provincial *Verband* or Union, Herr Hünerasky who stated in the course of his narrative that the co-operative movement was first introduced into Posen in the sixties in the form of Schultze-Delitsch loan societies, which made but little way in the smaller towns. Certain Polish co-operative societies that were

started about the same time prospered better. The history of the Polish co-operative societies furnishes the best proof that the co-operative movement is not the enemy of the middle class, as is so often alleged in opposition to the movement in Germany. By means of the Polish co-operative societies a new Polish middle class has been created. Nor are the German co-operative societies enemies of the middle class. They are ready to help it. The union of agricultural co-operative societies for the province of Posen was founded in 1895, since when the German agricultural co-operative movement has flourished. In 1895 the Union consisted of 106 societies. In 1903 there were 841. The central credit institution was founded at the same time as the Union, and in 1903 had a turnover of 152,000,000 marks (about £7,600,000).

Dr. Haas then presented the usual annual report of the *Reichs-Verband*, accompanied by statistics of the movement generally. In his preliminary observations he said that, on the whole, the progress of the movement during the past year had been unusually quiet and steady. The development and successful administration of the savings and loan societies had, indeed, been threatened by proposals for legislative interference with their rights to act freely as savings banks, and for the establishment of public savings banks on a system invented by Herr Scherl, who aimed at combining the encouragement of thrift with the attractions of a Government lottery. Fortunately, Herr Scherl's proposals were unanimously rejected by all sections of public opinion, including the public savings banks in whose supposed interests the plan was put forward; and it may be hoped the proposed interference with the rights of the co-operative credit societies to call themselves savings banks and to act as such will be heard no more of. The attacks upon the co-operative movement by traders have come to a head. They have no justification; for the success of the rural co-operative movement is not due to State help but to its own economic and moral strength. These attacks would do the movement no harm. On the contrary, they would help to bring into the movement those sections of the rural population which had hitherto stood aloof.

The general statistics presented by Dr. Haas showed that, up to July 1st, 1904, the total number of co-operative societies in Germany amounted to 22,400, of which 18,309 are agricultural—consisting of 12,477 savings and loan societies, 1,754 agricultural supply associations, 2,718 dairy societies, and 1,365 miscellaneous societies. A substantial increase has to be recorded in all branches, but



especially in the agricultural supply branch. Of the 18,309 rural co-operative societies more than half are directly or indirectly affiliated to the *Reichs-Verband*, which embraces (up to July 1st, 1904) 28 unions, 54 central societies, 7,034 savings and loan societies, 1,927 supply associations, 1,370 dairy societies, and 615 miscellaneous societies.

The national and provincial central credit institutions of the *Reichs-Verband* had in the year 1903 a collective turnover of 1,782,000,000 marks (£89,100,000), against 1,623,000,000 marks (£81,150,000) in the previous year. The sums advanced to societies amounted to 301,000,000 marks (£15,050,000), against 286,000,000 marks (£14,300,000) in the previous year. The sums paid in by the societies amounted to 311,000,000 marks (£15,550,000), against 302,000,000 marks in the previous year, so that the surplus amounted to 9,000,000 marks (£450,000). The collective working capital at the end of 1903 amounted to 118,000,000 marks (£5,900,000), against 96,000,000 marks (£4,800,000) in the previous year, of which 9,440,000 marks (£472,000) was their own unborrowed capital, as against 7,270,000 marks (£363,500) in the previous year.

Of the central credit institutions outside the *Reichs-Verband*, the isolated institutions (Wachenheim, Treves, Stuttgart), had a turnover of 81,000,000 marks (£405,000), as against 75,000,000 marks (£375,000) in the previous year; the central credit institution of the Landowners' League (*Bund der Landwirthe*), 149,000,000 marks (£745,000); the central bank at Neuwied (Raiffeisen organisation), 660,000,000 marks (£33,000,000), against 530,000,000 marks (£26,500,000) in the previous year. The collective turnover of all the central credit institutions amounted, therefore, to 2,672,000,000 marks (£133,600,000) in 1903, as against 2,340,000,000 marks (£117,000,000) in the previous year, an increase of 332,000,000 marks (£16,600,000).

The central supply associations affiliated to the *Reichs-Verband*, numbering (with the addition of the agricultural head society in Berlin) twenty-three, procured in 1903 supplies to the value of 57,100,000 marks (£2,855,000) as against 51,000,000 marks (£2,550,000) in the previous year. The amount was 24,740,000 cwt.—say 1,237,000 tons—against 19,700,000 cwt.—say 985,000 tons—in the previous year. In addition to this the central institution at Neuwied supplied agricultural necessities to its affiliated societies

to the value of 50,000,000 marks (£2,500,000); the German Agricultural Society supplied manure, seeds, and feeding stuffs to the amount of 7,000,000 cwt. (say 350,000 tons); the central establishment of the Landowners' League 3,100,000 cwt. (say 155,000 tons) valued at 5,000,000 marks (£250,000). The supplies obtained by all the societies connected with the *Reichs-Verband* amount, in round figures, to 75,000,000 marks (£3,750,000), while those of agriculture in general are estimated at 140,000,000 marks (£7,000,000). The central institutions for the sale of butter connected with the *Reichs-Verband* have sold, in round numbers, 10,500,000 marks (£525,000) worth of butter, against 6,250,000 marks (£312,500) worth in the previous year.

The central co-operative bank of the *Reichs-Verband* has completed its second year of working, and the turnover amounted to 222,000,000 marks (£11,100,000); the importations of supplies by the Hamburg supply branch amounted to 486,190 cwt., value 3,835,069 marks (say £191,752).

Good progress has been made in the matter of co-operative sale of grain, especially in Bavaria, Baden, Elsass-Lothringen, and Hesse-Nassau, and modifications have been made by the German Corn-store Commission in the conditions under which the Prussian Government corn stores are let. The same commission took the opportunity of refuting the attacks of the union of German wholesale dealers in manures and feeding stuffs on the co-operative corn-store societies.

The co-operative sale of eggs has made great progress in Hanover, Schleswig-Holstein, Oldenburg, and Baden.

The activity of the *Reichs-Verband* has extended in various directions, notably in that of providing means for the specialised education of co-operative officials and of special benefit and insurance funds for them.

The next annual meeting will be held at Strassburg.

Papers were read and discussed and resolutions passed on the following subjects:—

I. The attitude of the *Reichs-Verband* towards the Scherl savings bank proposals.

These proposals were condemned as tending to cripple the means of co-operative institutions combining the functions of savings banks and providers of the personal credit which is an absolute necessity

for the rural population ; and also as tending to corrupt the minds of the people by the introduction of a gambling element into savings bank business.

II. The moral motive power of co-operative work.

III. The improvement of the relations between central and local co-operative societies for sale and purchase.

The resolution passed with regard to this subject lays stress on the necessity of dealing on the largest possible scale in the purchase of manures and feeding stuffs, &c., and in the sale of farm produce ; on the necessity of greater loyalty on the part of the local societies to the central societies with which they deal, so as to strengthen their hands in making bargains with such bodies as the basic slag manufacturers, the potash syndicate, &c. ; on the necessity of placing all societies carrying on this kind of business on a sound financial basis by inducing the individual members to undertake larger liabilities and put up more working capital ; on the necessity of putting an end to the dealing of societies with non-members, which unnecessarily embitters the opposition which exists between co-operative societies for purchase and sale and ordinary traders, and is also a hindrance to the regular growth and development of genuine co-operation.

IV. Trade attacks on the co-operative movement.

V. Loans for labourers' cottages.

VI. Contributions of agricultural co-operative societies to chambers of commerce.

VII. The carrying forward of deficits in the accounts of co-operative societies.

VIII. Co-operative supply of wholesome milk to towns.

IX. Position of apprentices in co-operative dairies.

The proceedings closed with a banquet and excursions : one over the Russian frontier, and one to inspect some of the German agricultural colonies in Polish districts.

The general conference of the union of co-operative societies on the Schultze-Delitsch system (*Allgemeiner Verband deutscher Erwerbs-und Wirtschafts-genossenschaften*) was held at Breslau on the 24th and 25th of August, under the guidance of Dr. Crüger, of Charlottenburg.

Though some rural districts and agricultural communities are served by societies belonging to this organisation, its chief sphere

of usefulness is the urban artisan population. The details of the report need not be gone into here. The most remarkable event of the past year was the merging of the special central bank of the organisation, hitherto known as *Soergel, Parrisius & Co.*, in the Dresden Bank. The Schultze-Delitsch credit associations are stated to be working at the present time with about 700,000,000 marks (£35,000,000) worth of savings and deposits. This organisation and its affiliated societies have never received any direct State aid.

The attitude of the Schultze-Delitsch organisation towards the Scherl savings bank proposals and the proposals to found post-office savings banks in any shape is as uncompromisingly hostile as that of the Raiffeisen and *Reichs-Verband* organisations. Such proposals tend to hamper the beneficent action of co-operative societies in placing the savings of the people at the disposal of the people, on favourable terms, for productive purposes.

Dr. Crüger, in the course of his address, while maintaining the German character of the movement over which he presides, strongly denounced all attempts to import anything savouring in any way of politics into the working of any co-operative societies, or any attempts at emphasising the interests of any one race or religion in districts where the inhabitants were of more than one race or religion, and where any sort of conflict between persons of different races and religions existed. A co-operative society is a business association, with a social background, inasmuch as it helps the weak. Any attempt to put adventitious life into it by the introduction of matters foreign to its proper business, especially matters of a political character, is harmful.

H. DE F. MONTGOMERY.

# AN INVESTIGATION, IN CO. WEXFORD, OF A DISEASE IN YOUNG CATTLE.

## INTERIM REPORT.

The cattle trade of Ireland is so important that any serious misfortune to it, such as an outbreak of any of the scheduled contagious diseases, would be viewed almost in the light of a national disaster. Fortunately, this country for a number of years past has enjoyed an enviable freedom from such diseases. Notwithstanding one has not to inquire very deeply to discover the existence of a serious bovine mortality, brought about by diseases, which, unlike the scheduled diseases, exert their evil influence in a more or less subtle manner, but, like them, depend on a specific cause for their propagation. The annual financial loss from the ravages of these diseases has been enormous. In 1903 the Department therefore undertook an investigation of a disease affecting young cattle, which had hitherto not been thoroughly studied. This report deals with results already obtained, but the investigation is not as yet complete.

For many years past farmers in various parts of Ireland have lost a considerable number of their young cattle from a wasting disease which was almost always accompanied by a scour.

### History.

Although this mortality was more or less erratic, according to seasons and circumstances, it may safely be said that there are few farms in certain districts which have not paid tribute to the death roll. The disease appears in the autumn and winter months among cattle less than two years old, the chief symptoms being wasting and scour. The victims often linger for months, but the mortality is always very high, and the disease is very intractable to treatment. Few affected animals recover, and even if recovery does take place it is so protracted that the cost of treating and caring the animal back to health exceeds its value.

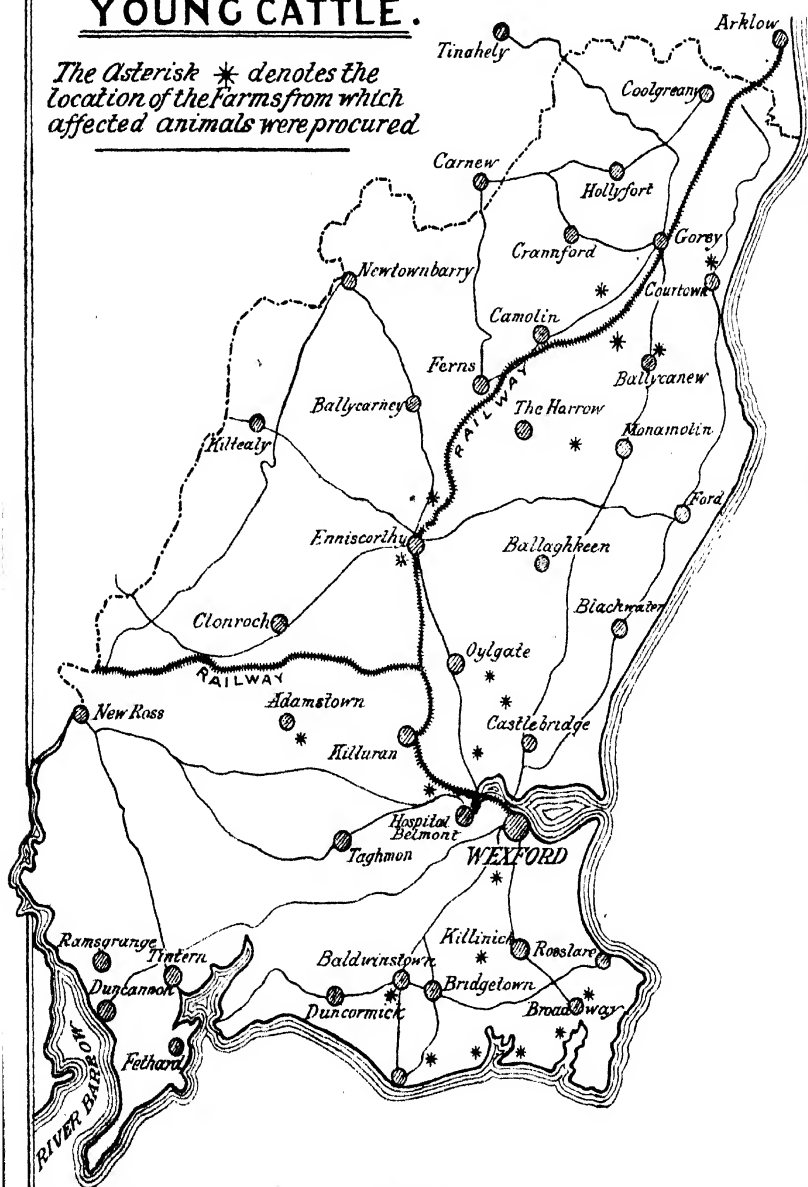
As to the cause of the mortality various theories have been advanced. It has been ascribed to fluke, big-gall, "consumption," &c. It was said by some to be hereditary, and that certain breeds of cattle were more subject to it than others. Again, the opinion was often expressed that the mortality was largely due to negligence and improper care.

# INVESTIGATION IN CO. WEXFORD

## OF A DISEASE IN

### YOUNG CATTLE.

*The Asterisk \* denotes the location of the farms from which affected animals were procured*





Last year (1903) the Department determined to investigate this mortality in young cattle, and through the kindness of Mr. C. H. Peacocke, J.P., C.C., a suitable site for an experimental hospital was obtained in Co. Wexford, where the mortality was known to prevail. The investigation was commenced in the autumn, and is still proceeding. The results already obtained appeared to warrant the publication of an interim report, with suggestions as to curative preventive measures, before the reappearance of the disease in the present year.

The objects of the investigation were to gain information on the following points:—

- (1.) Extent of mortality.
- (2.) Its nature and cause.
- (3.) Its treatment.
- (4.) Its prevention.

The disease has been known in Co. Wexford for a great number of years. The majority of farmers are, unfortunately, only too familiar with it, although there are some farms which have up to the present enjoyed immunity. The mortality during the past winter appears to have been higher than usual, owing, no doubt, to the exceptionally wet season. While no very accurate statistics can be given regarding the number of fatal attacks, still, there is authentic information that it exceeded at the very least 300 animals. The disease invaded almost every district in the county, and some farmers lost as many as a dozen yearlings. The accompanying map shows the location from which affected animals were drawn for the investigation, and how widespread is the disease throughout the county. In the early summer animals which have survived the winter attack may sometimes be noticed in the fields. These cattle are easily recognised by their hide-bound coat, wasted condition, ænemic appearance, and listless manner. Such are the remains of what were, in the previous autumn, vigorous and robust animals. The financial loss, which, of course, varies with the age of the victim, might on the average be estimated at from £4 to £5 per head. The loss arising from the depreciation in the value of young cattle which have survived a mild attack is also very serious.



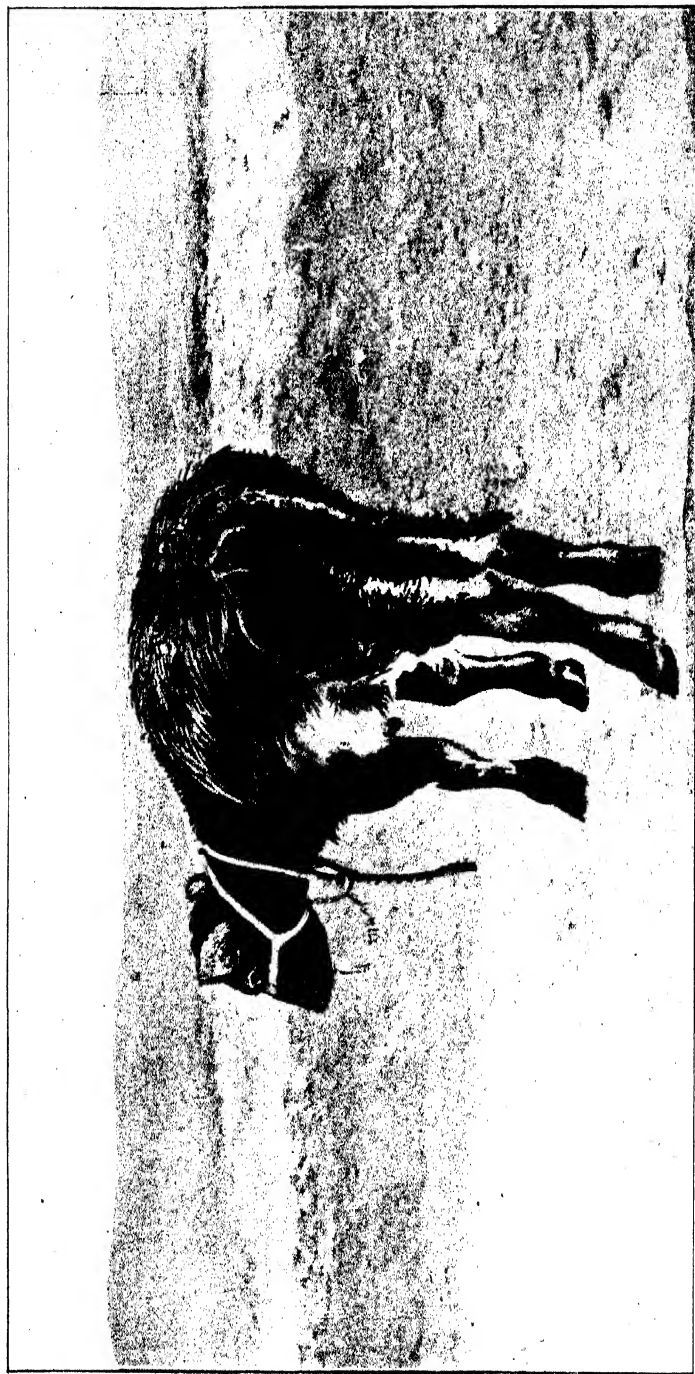
The disease is usually confined to cattle under two years old, although older ones are not immune.

**Symptoms.** The great majority of cases are met with in animals ranging from six to eighteen months of age. The malady makes its appearance in the autumn and winter months, but occasionally cases are encountered in the spring and early summer. The great majority of outbreaks, however, occurs from October to April. The animals attacked usually become unthrifty and gradually waste, but at times more or less acute symptoms are present from the commencement. In the majority of cases it is first noticed that the victim is not thriving as well as the rest of the herd. The animal gradually assumes a dull stunted appearance, although the appetite and general health are apparently not much impaired. After a time a scour appears, and the animal, notwithstanding a fair consumption of food, slowly degenerates into a wasted, hide-bound object, with a languid expression and feeble movements. In this miserable condition the beast may linger for weeks or even months, occasionally rallying somewhat, but still steadily growing weaker, until at last it becomes so enfeebled that it cannot stand, and death from sheer exhaustion generally follows in a few days after this stage is reached. In other cases the disease is ushered in with a scour, the excrement being greenish or brownish in colour. When this occurs it runs a more acute course and terminates sooner than in cases where wasting precedes the scour. The scour often ceases for a few days, and can even be temporarily held in check by astringents. As the disease progresses the discharges become more frequent and fetid, and adhere to the hind-quarters of the animal, giving it a dirty appearance and an offensive odour. The eye-balls gradually sink during the illness, so that before death they are retracted to a remarkable degree. The appetite is, as a rule, fairly well maintained, but varies with the individual. Some animals eat ravenously even up to death, while others are most capricious feeders. Occasionally, in the later stages a victim exhibits a tendency to dropsy, and a bag may form under the jaw. (See figure 9).

During the winter many *post-mortem* examinations were made on animals which died of the disease and which were drawn from widely separated parts of the county. The examinations showed little variation in the morbid appearances. The carcasses were greatly wasted, and some of them were dropsical. The internal organs were pale and bloodless; the lungs and heart, except



An Investigation, in Co. Wexford, of a Disease in Young Cattle.



for their blanched appearance, were healthy. The first three stomachs were invariably healthy. The condition of the fourth varied; in some cases it was in a state of catarrh, and in colour varied from rose to purple; in others it was pale, with swollen, soft and dropsical walls. In no case was the fourth stomach normal. In some cases the intestines showed acute inflammation of recent origin, which was probably the immediate cause of death. The kidneys were sometimes dropsical, although otherwise normal. The liver in 40 per cent. of the cases harboured fluke and was larger and firmer than normal. The increase in size and firmness was almost altogether due to thickening of the bile ducts, brought about by the influence of the fluke in them. The gall-bladder was distended in a number of cases. This condition of big-gall, as it is popularly termed, is not in itself serious. It is in reality a mechanical complication, brought about by the flukes causing an increased flow of bile into the gall-bladder, while the duct leading from it to the intestine is often partially closed by the state of catarrh existing in the duct and bowel. From this description of the after-death appearances it will seem that no organic disease was manifest. The changes observed simply indicated that a pernicious drainage from the animal's system had taken place—that the nutriment with which the animal had to grow and sustain itself had within the body been diverted to some abnormal channel. Now the question arises, what constitutes this abnormal channel? Its constitution can no longer be a matter of conjecture, for at every *post-mortem* examination a parasitic worm—a nematode—was present in myriads in the fourth stomach, which organ is in reality the base of supply for the animal's system. It was also noted that this organ was the one most constantly found to be the seat of morbid change. The disease is therefore undoubtedly parasitic in character. In other words, it might, figuratively speaking, be described as a "tug-of-war" between the animal or host and worms or parasites. If the latter (parasites) are not present in sufficient force the former (the host) has the upper hand and shows no ill effects; but if the worms are present in large numbers their victorious position soon becomes apparent through the stunted unthrifty appearance of the animal. In its parasitic nature the disease does not differ widely from such contagious diseases as anthrax, foot-and-mouth disease, tuberculosis, &c., which depend for their existence and propagation, on the invasion of the tissues by a very *minute vegetable parasite*, while the malady

under discussion is produced and propagated by comparatively *large animal parasites* harbouring in the stomach. It should, however, be pointed out that the *mode* of propagation is widely different, as in the diseases due to the vegetable parasite it is sufficient to directly transplant the parasite from one animal to another to propagate the malady, while in this disease the parasite (as will be seen later on) must pass through a certain intermediary stage before the transition from animal to animal is effected.

The parasite, named *Strongylus gracilis* by Professor M'Fadyean,

belongs to the class of worms called nematodes, or thread worms. It is almost microscopic in size, but when isolated and placed

**The Parasite.** in water it is visible to the naked eye in good light, and has the appearance of a short fine white or grey hair. The body is round and its surface is smooth. The cuticle or skin is transparent and elastic. Within the worm the alimentary and reproductive organs are easily seen. The alimentary organs consist of a mouth, an alimentary tube which runs almost straight through the worm, a rectum and anus. The mouth is an unarmed circular opening situated at the tip of the anterior extremity. The rectum is short, of smaller calibre than the intestine, and terminates in the anus, which is situated near the tip of the tail.

Males and females are represented. The latter are somewhat larger and more numerous than the males.

**The Male Parasite.** The largest males measure up to 3·82 mm. (millimetres\*). The body is broadest at its hinder end, where it measures 0·06 mm. across, and tapers gradually towards the head. Just in front of the extremity of the tail the body of the male is furnished with two dark yellow spicules. The tail spreads out into a delicate bell-shaped pouch or "bursa," which is supported by a number of ribs. Of these ribs the median one is tapering and divides at its tip into two branches, each of which immediately re-divides into two short branches. On either side of this median stem the bursa carries six ribs, the posterior and anterior being much smaller than the middle four. The posterior rib is short and points backwards and inwards. The anterior rib is also short, but points forwards and outwards. The four middle ribs are close together and about equal in length; the foremost of these middle ribs points forwards, the others point backwards. These spicules and ribs are used to grasp the female

\* A millimetre equals 0·03937 of an inch, or about  $\frac{1}{25}$  of an inch.

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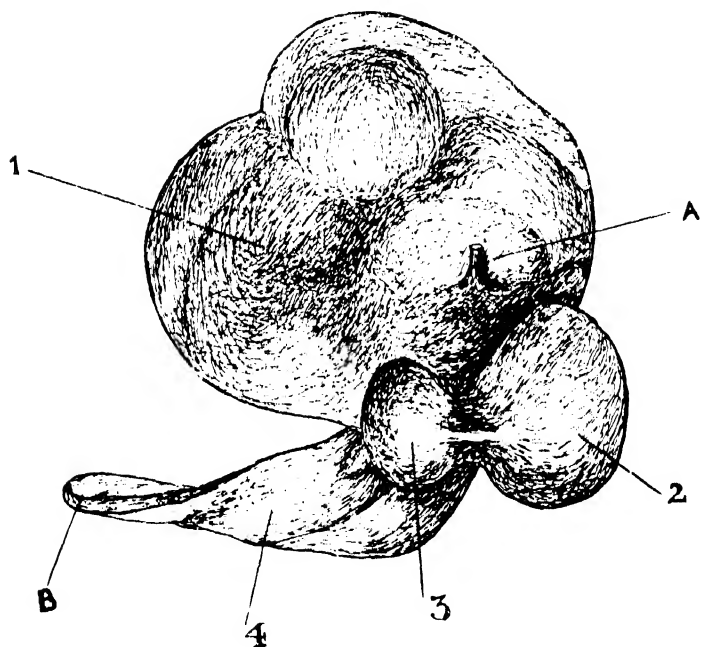


FIG. 3.—STOMACHS OF THE OX (*from a Photograph*).

1. First stomach or Rumen ; 2. Second stomach or Reticulum ; 3. Third stomach or Omasum ; 4. Fourth stomach or Abomasum.

A. Where gullet enters first stomach B. Where fourth stomach joins intestine. It is in the fourth or true stomach that the parasites are found.

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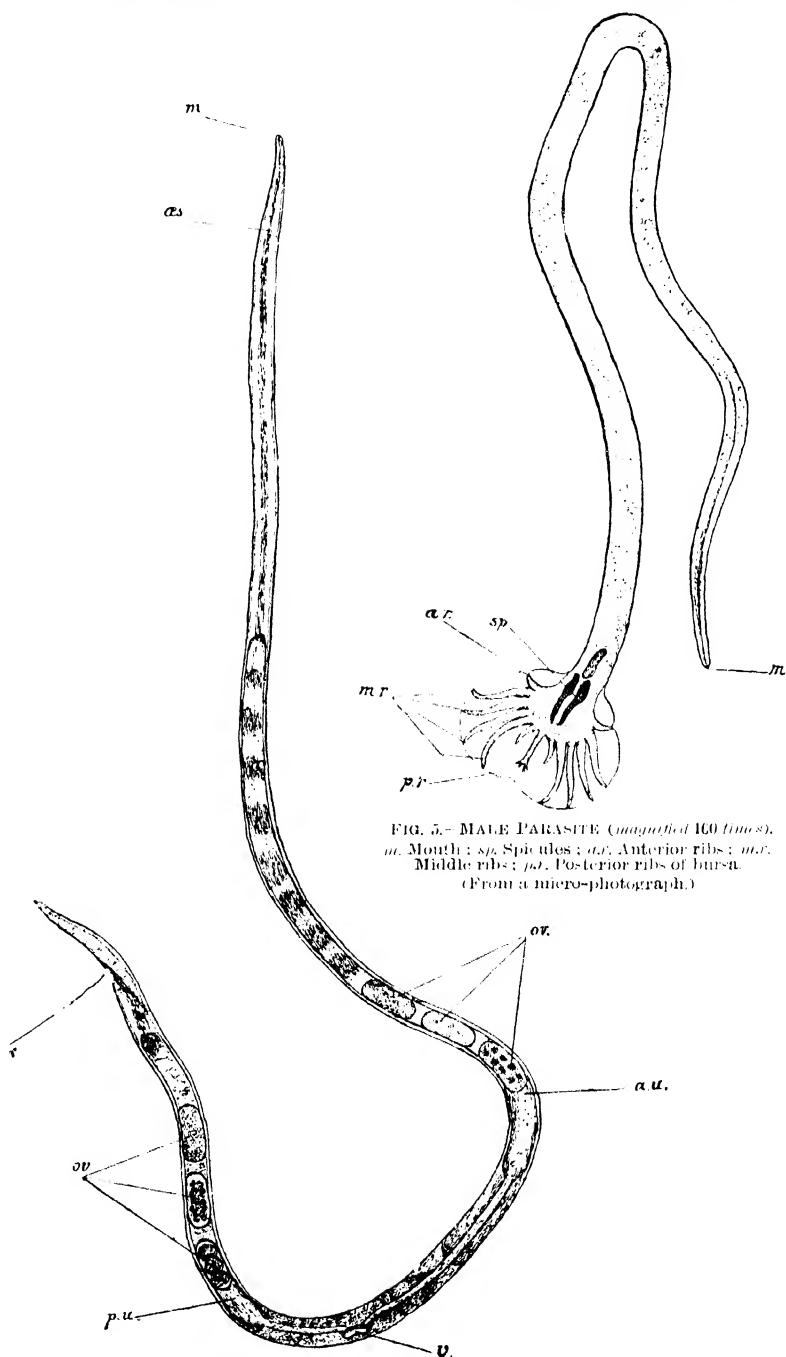


FIG. 5.—MALE PARASITE (magnified 100 times).  
*m.*, Mouth; *sp.*, Spicules; *a.f.*, Anterior ribs; *m.r.*,  
 Middle ribs; *p.r.*, Posterior ribs of bursa.  
 (From a micro-photograph.)

FIG. 4.—FEMALE PARASITE (magnified 100 times).

*m.*, Mouth; *a.s.*, Gullet; *o.v.*, Eggs in the uteri; *a.u.*, Anterior uterus; *p.u.*, Posterior uterus; *v.*, Vulva; *r.*, Rectum. (From a micro-photograph.)

An Investigation, in Co. Wexford, of a Disease in Young Cattle.

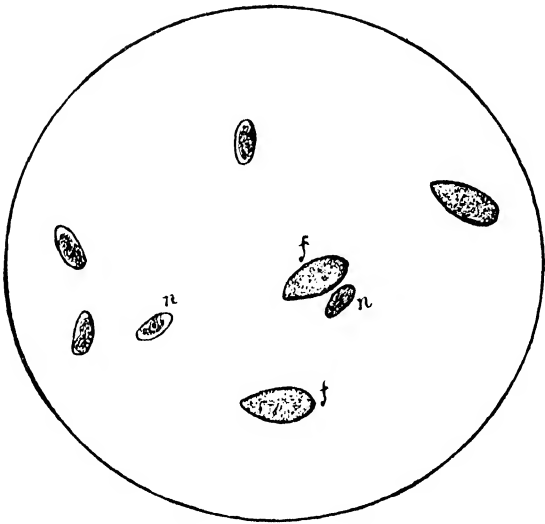


FIG. 6.—EGGS OF THE FLUKE AND NEMATODE.  
(Magnified 160 times.)  
f. Fluke eggs; n. Nematode eggs.  
(From a micro-photograph.)

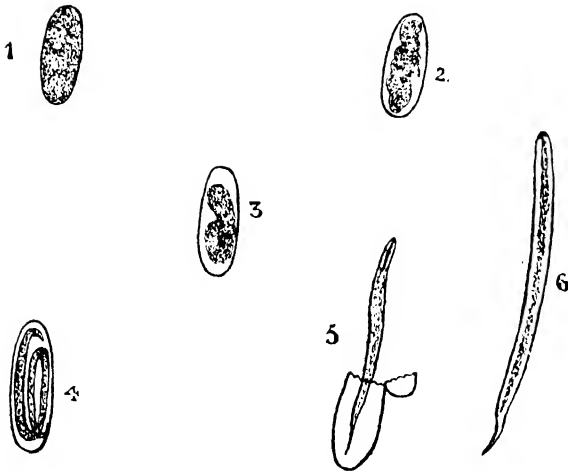


FIG. 7.—SUCCESSIVE STAGES IN THE EVOLUTION OF THE  
EMBRYO PARASITE.





during copulation. The testicle and seminal tube lie in the hinder part of the body along side the alimentary canal. The seminal tube opens with the rectum.

The largest females measure up to 4.32 mm. long. The body is thickest in front of the vulva, where it measures 0.06 mm. From the vulva backwards the breadth is uniform to near the tail, which terminates in a slightly curved point. In front of the vulva the body tapers gradually to the head. The vulva, which has a crescentic opening, is situated about 0.80 mm. from the posterior extremity. From the vagina the uteri pass backwards and forwards. The posterior uterus or womb measures in length about 0.48 mm., the anterior about 2.16 mm. The uteri contain a number of eggs (from four to eight) of a relatively large size, placed lengthways one after another.

The ripe egg is oblong in shape; it measures about 0.08 mm. long by 0.03 mm. broad, and is of a dark violet colour. Its contents are lobulated, giving the egg the appearance of a miniature ox's kidney. The eggs are always found in the droppings of affected animals, a single stool of a badly-infected animal containing upwards of 300,000 eggs. In searching for these eggs for the first time care must be taken not to confound them with the eggs of the fluke, which are also frequently present in the droppings of affected cattle. The fluke eggs, however, are easily distinguished by their larger size and yellowish colour. (See figure 6.)

In one or two cases another thread worm (*Strongylus convolutus*) was found accompanying the parasite above described. It was, however, so rarely met with that the part played by it in the mortality must be insignificant. Another worm, namely, the *Trichocephalus*, was found occasionally in the bowel, but no morbid change could be attributed to its presence. As mentioned before a large percentage of *post-mortems* revealed the presence of fluke in considerable numbers, with the usual complications, viz., enlarged liver and distended gall-bladder, and a point for consideration was—what part do the flukes play in the mortality? When an animal becomes infected with flukes in addition to the thread worms, there is no doubt the ravages of the former assist the latter in reducing the strength of their host. But it is, indeed, improbable that the fluke plays a more important part in producing

the mortality, for a large number of *post-mortem* examinations revealed the presence of no parasites to speak of except the thread worms. This proves beyond all doubt that the thread worm, when sufficiently numerous, is capable of causing death without the assistance of the fluke. Again, it should be noted that the clinical symptoms in animals harbouring fluke in addition to the thread worm were similar to those exhibited by animals harbouring the nematode only. It is also well known that fluke is not considered so serious a malady in cattle as in sheep. The livers of some of the best fat cattle are often found in an advanced state of cirrhosis due to the ravages of the fluke, and yet these animals were never known to show any ill effect therefrom. All these facts go to show the thread worm is the chief casual factor, and that the fluke, when present, is only an accessory.

This leads up to another point, viz., errors in recognising the disease produced by this thread worm. It is a rather common error to accept as the cause of death, after a cursory *post-mortem* examination, what appears to be the most prominent morbid change, and at once to exclude the possibility of any occult pathogenic cause. It often occurs in this disease, that even after a *post-mortem* examination the cause of death is attributed to fluke or "big-gall." No doubt enlarged livers and gall-bladders containing fluke are often met with in cattle which have died from scour and wasting disease, but as shown above it does not follow that death is to be attributed to fluke—in fact, it is highly probable that if a search were made the causal agent would be found in the presence of the thread worm in the fourth stomach. The disease, however, can be accurately diagnosed even before death by the use of the microscope. The droppings of affected animals contain large numbers of the eggs of the thread worm, and if these are found the diagnosis is placed beyond doubt. After death, scrapings from the wall of the fourth stomach and its contents, when examined under a lower power of the microscope, reveal large numbers of the worms.

The investigation on this point is not yet complete. The early stages of the life-history of the parasite have, however, been ascertained. Briefly they are as follows:—The parasite lays its eggs in the stomach of the animal, and these are passed out with the droppings. In about four days the eggs

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FIG. 8.—An acute case, showing appearance shortly before death.

[From a photograph.]



FIG. 9.—A case with dropsical bag under the jaws at A.

[From a photograph.]

develop and little wormlets or larvæ are hatched out. These larvæ live and grow in the damp earth on the surface of the soil. They will not live in water for any length of time. This is important, as it excludes water from the source of infection. On the pasture the larvæ grow rapidly, and there is no doubt that they are taken into the stomachs of healthy cattle grazing on pasture contaminated by diseased cattle. A complete knowledge of the life-history of the parasite would undoubtedly provide the key to the most rational methods of dealing with the mortality.

In treating a disease such as this, one of two methods might be pursued, or both might be combined. Remem-

#### **Treatment.**

bering the analogy of the disease to a "tug-of-war," it will be readily understood that

one line of treatment might be directed towards the destruction of the parasites, while the other might be applied to strengthening the animal, or that both might operate together. During the past winter a number of experiments were conducted on the treatment of affected animals, and the results can scarcely leave any doubt as to the superiority of the policy of sustaining and strengthening the host, and not attacking the parasite. A number of animals were put under a course of medical treatment, with large doses of comparatively non-poisonous drugs, such as acetozone, creolin, izol, and formalin, without any apparent beneficial effect. When one considers that the parasite is in an almost impregnable position, *i.e.*, in the fourth stomach of the host, and the fact that even poisonous doses of drugs would be highly diluted before reaching the habitat of the parasite, it is not remarkable that the results were not more satisfactory. Indeed, the policy of attacking the parasite by the administration of drugs appears to be not only useless but detrimental, for the annoyance and fatigue occasioned to the animal by the administration of the dose apparently causes more injury than is counterbalanced by the expected beneficial effect of the drug. A few animals were selected to try the alternative mode of treatment, the results of which were much more satisfactory. These animals received no drugs beyond an ordinary tonic. The sole treatment consisted in giving them as much nutritious food as they would consume, in the shape of carefully prepared flake meal gruel and linseed cake with good hay, &c. Any animal on which this treatment was commenced fairly early lived, although recovery was protracted. Therefore, the line of treatment which these experiments would indicate would be the following short and simple method:—Keep a careful eye on the young stock

during the autumn and winter months. If any are noticed not to be thriving, or if a scour appears, the affected animal should be isolated, and comfortably housed at once, in a well-ventilated house or shed. The treatment should consist in supplying the animal with as much nourishing food as it will consume; if the appetite is fickle gruel should be drenched into the animal. A liberal supply of carefully prepared oatmeal gruel, and a mixture of chopped hay and linseed cake, with a little roots, to which may be added a gentian and iron tonic, appears to be the most suitable ration. Recovery on this treatment may not be a matter of rapid achievement, but the animal will at least hold its own, and in time gradually gain strength, and overcome the parasite. Too much stress cannot be laid on the importance of commencing this treatment at the appearance of the *earliest symptoms*. By delay the animal loses ground, while the parasite is daily becoming more and more aggressive. The longer the disease is established the more difficult and disappointing will the treatment be. The main object to be kept in mind is that the all-important point consists in maintaining the strength of the animal by every possible means. Owing to their debilitated condition affected animals are very subject to acute attacks of inflammation of the bowels, which often fatally and abruptly terminates the illness. To ward off these attacks great care should be paid to the general comfort and nursing of the animal. The famous William Youatt wrote the following words almost a century ago:—"There can be no doubt that more benefit is connected with that one word *comfort* than can be procured from half the drugs which the Veterinary Pharmacopœia contains." These words are as true to-day as when they were written, especially so in respect to this disease.

With a definite knowledge of the life-history of the parasite it would be easier to formulate preventive measures; sufficient, however, is at present known to suggest some useful precautions.

#### Prevention.

The main object of preventive measures would be to destroy and prevent the spread of the larvæ on the pasture. With this object in view farmers should dry and burn, or collect and bury in quick lime, all the faecal discharge and soiled litter of affected animals, so as to destroy the eggs and larvæ therein. If this proceeding were carefully carried out it would greatly diminish the amount of infective material. As it is now definitely known that the parasites grow during their sojourn on the pastures, measures should be

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FIG. 10.—An animal in the early stages of recovery, still somewhat emaciated. This animal received as much nutritious food as it would consume but no drugs, with the exception of a tonic.

[From a photograph.]



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FIG. II.—Another case in the early stages of recovery. This animal received no medicinal treatment, but was well cared and fed. Though still affected with parasites, it is slowly improving in condition. *[From a photograph]*

taken to destroy the parasites on the grass. For this purpose the land may be limed or dressed with salt. Great care should be taken not to allow convalescent cattle on the pasture during the early summer, as they are undoubtedly a great source of infection. It is much safer to keep them confined to the house until they have completely recovered. It would also be useful to put horses on infected land for a season or two, in order to give it a rest from ruminants for a time. Badly infected land should be put under tillage. Young cattle should be brought in early off the grass in the autumn, and if it is not convenient to do this the grass should be supplemented from September onwards with a concentrated food (cake or corn), roots, and hay. It is fatal to allow the young animals to fall back in condition at this season, for, if they harbour parasites, any weakening of the system gives the latter a favourable opportunity to commence their ravages, and once the parasites get the upper hand, and emaciation commences, the outlook is not bright.

J. H. NORRIS.

## BUTTER-MAKING AND THE BUTTER TRADE IN THE NETHERLANDS.\*

A considerable portion of the soil of Holland is eminently suited by its nature for pastoral purposes, and accordingly cattle-breeding and dairying constitute the staple industries of a large part of the country population. This is especially true of the provinces of North Holland, South Holland, and Friesland, and also, though to a somewhat less extent, of the province

**Cattle-rearing in** of Utrecht. In these provinces cattle-  
**Holland.** breeding has been a staple industry among  
the country population for centuries; and in

the course of the last twenty-five years the cattle industry—especially the dairying branch—has received very general attention in other parts of the Netherlands also. This extension of the pastoral activities of the Dutch is partly attributed to the low prices received of late for cereals, and partly to the spread of agricultural knowledge. The low price of corn has compelled the farmer to replace, to a large extent, the cultivation of corn by that of green crops, and to apply himself to the laying out and improvement of pastures.

The following table will give some idea of the present position of the cattle industry in Holland:—

Provinces.	Total Acreage under Crops.  Acres.	Total Acreage Permanent Pasture.  Acres.	Number of Milk Cows.	Total of Cattle.	Number of Head of cattle per 1000 Acres of Land under Crops and Grass.
North Brabant, . . .	366,094	302,002	117,877	207,397	310
Gelderland, . . .	297,035	379,819	102,036	210,124	310
South Holland, . . .	157,445	404,284	161,109	243,683	434
North Holland, . . .	105,071	375,585	119,121	168,537	350
Zeeland, . . .	270,045	84,753	27,235	80,622	227
Utrecht, . . .	47,950	176,434	65,602	103,279	460
Friesland, . . .	112,543	516,640	148,801	240,723	382
Overijssel, . . .	148,585	313,606	88,765	141,681	306
Groningen, . . .	312,798	149,331	39,542	88,809	192
Drenthe, . . .	107,047	167,209	42,221	74,306	270
Limburg, . . .	222,908	61,839	55,183	67,795	308
<b>The Netherlands, . .</b>	<b>2,147,521</b>	<b>2,931,502</b>	<b>967,492</b>	<b>1,646,856</b>	<b>324</b>

\* Reports and Memoranda of the Agricultural Department of the Netherlands.  
No. 1.—The Production of Butter and the Butter-Control in the Netherlands.

The present position of the butter-making industry may be gauged  
**The Dutch Butter** from the following statement:—  
**Industry of to-day.**

Provinces.	Butter produced on Farms.	Butter produced in Factories.
	lbs.	lbs.
North Brabant, . . . .	7,055,000	8,598,000
Gelderland, . . . .	8,378,000	7,540,000
South Holland, . . . .	9,922,000	3,043,000
North Holland, . . . .	4,188,000	1,543,000
Zeeland, . . . .	4,188,000	639,000
Utrecht, . . . .	2,866,000	849,000
Friesland, . . . .	4,189,000	23,750,000
Overijssel, . . . .	7,937,000	6,129,000
Groningen, . . . .	2,425,000	2,480,000
Drenthe, . . . .	1,279,000	6,504,000
Limburg, . . . .	5,291,000	4,960,000
The Netherlands, . . . .	57,718,000	68,035,000
	125,753,000	

It is estimated that the export of butter now amounts to about 38½ million lbs. to Great Britain, 15½ to 17½ million lbs. to Germany, 7½ million lbs. to Belgium, 2½ to 3½ million lbs. to France, and a comparatively small quantity to other countries. The export to England and Scotland takes place *via* Harlingen, Rotterdam, and Amsterdam.

#### Export of Butter.

Large quantities, amounting last year to from 26½ to 29 million lbs., were shipped from the first-named port. Butter, intended for Germany, Belgium, and France, is of course forwarded by rail, consignments from the north of the country partially going in refrigerator vans. It is now nearly always packed in Danish beechwood casks of 55 lbs. and 110 lbs. nett weight; also in tubs, cases, and boxes containing butter in rolls of ½ lb., or small pats of various weights. Butter from Eindhoven and Maastricht is forwarded in baskets.

A great deal of the butter intended for tropical climates is now packed in air-tight tins, and the former mode of packing (double casks separated by salt) is gradually disappearing.

As far as the butter itself is concerned, it is forwarded both fresh and salt. France and Belgium take almost exclusively fresh, Germany chiefly fresh, whilst England and Scotland receive principally salt butter.

Although a great deal of butter is sold to order, or through agents, both here and abroad, large quantities are also still forwarded by way of consignments. The co-operative factories, especially, dispose in this way of part of their product in England. The existing opportunities to sell at the auctions coupled with other circumstances have tended to diminish consignments abroad.

Perhaps the most striking feature of the butter-making industry in Holland is the large proportion of the total butter production—over 55 per cent.—that is made in factories.

How large a part the butter-factory plays in the dairying economy of the Netherlands will be seen from the statement in page 59 and from the following table:—

TOTAL NUMBER OF BUTTER FACTORIES.

PROVINCES.	Total Number of Butter Factories in the Years			
	1895.	1898.	1900.	1903.
North Brabant, . . . .	111	150	165	192
Gelderland, . . . .	43	83	84	90
South Holland, . . . .	30	39	47	40
North Holland, . . . .	9	18	23	32
Zeeland, . . . .	10	17	19	15
Utrecht, . . . .	7	8	11	13
Friesland, . . . .	78	113	127	129
Overijssel, . . . .	38	66	84	77
Groningen, . . . .	29	45	50	49
Drenthe, . . . .	36	80	94	102
Limburg, . . . .	92	137	172	195
The Netherlands, . .	483	756	876	934

The butter factories are of two kinds—co-operative and non-co-operative, and the numbers of each variety are as follows :—

### CO-OPERATIVE FACTORIES.

PROVINCES.	Co-operative Butter Factories in the Years							
	1896.		1898.		1900.		1903.	
	Steam Factories.	Hand-power Factories.	Steam Factories.	Hand-power Factories.	Steam Factories.	Hand-power Factories.	Steam Factories.	Hand-power Factories.
North Brabant, . .	3	42	6	104	13	119	28	156
Gelderland, . .	6	13	18	28	26	25	29	28
South Holland, . .	3	—	3	7	3	7	6	6
North Holland, . .	1	—	1	4	—	4	2	3
Zeeland, . .	6	3	6	5	7	4	5	1
Utrecht, . .	—	—	1	1	3	—	4	—
Friesland, . .	34	1	66	10	65	11	76	7
Overijssel, . .	7	—	13	11	16	17	19	20
Groningen, . .	9	4	18	6	23	14	33	12
Drenthe, . .	11	14	22	43	28	44	88	50
Limburg, . .	1	69	1	108	2	165	8	176
The Netherlands, .	80	136	145	327	184	400	247	458

### NON-CO-OPERATIVE FACTORIES.

PROVINCES.	Non-co-operative Butter Factories in the Years							
	1896.		1898.		1900.		1903.	
	Steam Factories.	Hand-power Factories.	Steam Factories.	Hand-power Factories.	Steam Factories.	Hand-power Factories.	Steam Factories.	Hand-power Factories.
North Brabant, . .	8	58	13	27	16	17	3	5
Gelderland, . .	13	11	24	13	27	6	24	9
South Holland, . .	23	4	17	12	27	10	25	5
North Holland, . .	2	6	11	2	11	8	23	4
Zeeland, . .	1	1	5	1	7	1	9	—
Utrecht, . .	7	—	6	—	7	1	9	—
Friesland, . .	40	3	45	2	40	11	38	8
Overijssel, . .	24	7	37	5	43	9	34	4
Groningen, . .	13	3	19	2	14	—	4	—
Drenthe, . .	11	—	15	—	20	2	5	9
Limburg, . .	6	26	5	23	5	10	3	8
The Netherlands	148	119	197	87	217	75	177	52

With regard to the co-operative factories, it may be noted that they include various forms of co-operative societies. Besides the co-operative works established in accordance with the Act of 1876 regulating the co-operative societies, a number of factories are still found, especially in the provinces of North Brabant and Limburg, which, according to the Act of 1855, are acknowledged as incorporated societies, whilst there are still a few factories, the members of which have not in any way legally combined.

In some very few cases factories belonging to private companies have in the above statements been included amongst the co-operative societies, but only when the articles of association and the system of working have shown that such factories are conducted entirely on co-operative principles.

The quantity of butter produced by a hand-power factory varies from about 11,000 lbs. to 45,000 lbs. per annum. Only a few factories produce less than the minimum, or exceed the maximum stated above. The **Productive Capacity of the Factories.** steam factories rarely produce less than 55,000 lbs., unless they have a dairy for the sale of fresh milk, &c., attached, and sometimes reach a quantity of 440,000 lbs. per annum.

The number of establishments which produce more than 225,000 lbs. amounts for the whole country to about eighty.

Some factories, which in reality are neither steam nor hand-power works, their motive power being derived from gas or other sources, have been placed under either of the two headings according to their production being larger or smaller.

In spite of the active development of the butter factories, a considerable quantity of butter is still produced on farms. It is not possible to give exact figures, as this butter is disposed of in many different ways. In addition to a considerable quantity used by the farmers themselves, there are also large quantities sold by the producer to shops, dealers and private persons for immediate consumption, or sent to market, &c.

**Butter Production on Farms.** However, taking into consideration the number of milch cows, the consumption of milk, the production of cheese, the rearing of young cattle, the production of the factories and the quantities marketed, it is possible to arrive at a fairly reliable estimate. For 1903 this amounts, as will be seen from the table on page 59, to nearly 58 million lbs.

A considerable quantity of farm butter is taken to market in lumps from about 1 lb. to 20 lbs., in kegs, or casks, or pails, or tubs.

Previous to the development of factories,

**The Marketing of** weekly butter markets were held in nearly  
**Butter.** every place of any importance, these

markets in some of the large towns being

an important source of profit to the inhabitants on account of the influx of country folk. The butter markets of Leeuwarden, Sneek, Meppel, Kampen, Zwolle, Deventer, Leiden and Delft, were especially known for the large quantities sold there, and even now the butter taken to these markets is considerable, although, especially as regards Leeuwarden, Sneek, Leiden and Delft, it is not at present by any means limited to farm butter.

The transfer of butter-making from the farm to the factories has

much contributed to the improvement of the

**State Aid.** quality of the butter in this country, but

the matter was not allowed to rest there.

On the part of the Government assistance was rendered in various directions, and care was taken that all necessary information should be available.

The Government experimental stations, of which there are at present five, with a technical staff numbering twenty-seven, made numerous experiments in connection with cattle feeding and milk production. Lectures were given by Government teachers of agriculture and other experts with a view to pointing out to owners of cattle what important advantages could be secured by proper breeding, by the cultivation and purchase of the most suitable feeding stuffs, by careful treatment of their cattle, and by rational feeding. Dairy experts appointed by the provincial agricultural societies, which receive a Government grant for this purpose, were continually instructing cattle-owners in everything they required to know in order to obtain a good and plentiful supply of milk; they gave advice and information wherever defects in the milk were discovered or mistakes made in the preparation of butter and cheese; at the same time they acted as advisers to those who intended improving the arrangements of a dairy factory or establishing a new one.

In order to afford young men an opportunity of studying the mechanical preparation of butter and

**State Schools.** cheese, the Government subsidised a special school for this purpose at Bolsward, in the

province of Friesland.



Before long this institution will be replaced by a Government dairy school with a view to the more scientific training of thoroughly competent managers of butter and cheese factories. This measure is fully justified by the important increase of the number of butter and cheese factories in the Netherlands.

The support given by the Government has not had the effect of lessening private initiative. On the contrary, many private manufacturers have done much to bring the dairy industry to its present state of perfection by studying what others are doing at home or abroad, and by making experiments which sometimes entailed a considerable expenditure. Indeed, many private factories are models for all interested in the dairy industry, both as regards the completeness of their equipment and the excellence of their management, as well as in the quality of the product.

As an instance of this private initiative, attention may be called to the dairy associations established by the **Dairy Associations and their work.** co-operative factories in the different provinces to make united efforts to improve the product, and to safeguard mutual interests.

There were successively formed:—The South-Netherland Dairy Association (1893), the Gelderland-Overijssel Association of Co-operative Dairies (1896), the Association of Co-operative Dairies of Drenthe (1896), the Association of Co-operative Dairies of Friesland (1896)\*, the North Brabant Dairy Association (1900), the Association of Dairies in the Province of Groningen.

By adopting a trade-mark, or in other ways, all these associations have taken steps to guarantee, as far as possible, that buyers of butter from the affiliated factories shall receive unadulterated fresh butter. The subjoined statement will show the development of these associations, and the total production in 1903 of the factories which have joined these organisations:—

ASSOCIATIONS.	Number of Affiliated Factories.	Aggregate Production. lbs.
Association of Co-operative Dairies of Friesland, . . .	56	15,800,000
South Netherland Dairy Association, . . . . .	142	4,400,000
North Brabant Dairy Association, . . . . .	122	4,400,000
Gelderland-Overijssel Association of Co-operative Dairies, . . . . .	25	3,800,000
Association of Co-operative Dairies of Drenthe, . . .	40	3,300,000
Association of Dairies of Groningen, . . . . .	27	1,600,000
Total, . . . . .	412	33,200,000

\* This Association succeeded the "Vereeniging van Belanghebbenden bij de Fabriekmatige Zuivelbereiding op Cooperatieven grondslag" established in 1893.

The above six dairy associations have been united since the year 1900 and form a "General Netherland Dairy Association (Federation of Associations of Co-operative Dairy Factories in the Netherlands)" (abbreviated as F. N. Z.).

In order to give an idea of the object of the dairy associations and of the means employed to attain it, the following taken from a pamphlet circulated by the F. N. Z. will be of interest.\*

1. The sale of the product is promoted by butter auctions and sales for joint account.

2. Agricultural co-operation is encouraged by giving lectures, issuing pamphlets or circulating leaflets, endeavouring to remedy defects in existing co-operative societies, making the articles of association of the co-operative societies agree with the spirit of co-operation, &c.

3. Butter tests are made which tend greatly to improve the quality of the product.

4. Control is exercised on the butter with a view to guaranteeing the purity of the product and to counteracting adulteration.

5. The transport of butter is benefited by using refrigerator vans and special trains for the conveyance of butter.

6. Book-keeping is under proper supervision, with a view to additional security as regards financial position.

7. Assistance is given in cases of interruption in working—to prevent stagnation—which promotes solidarity.

8. Purchases are made for joint account to obtain uniformity and cheapness in materials and packing.

9. Various papers are distributed to keep the members of the Association well informed of the requirements of, and modern improvements in, the dairy industry.

10. Trade-marks are registered, and certificates of purity are issued, in order to increase the commercial value of the product.

11. Tests and experiments are made to determine the most suitable mode of preparing dairy produce in cases where various methods are followed, and, further, to decide as to the value of suggestions, or to remove misunderstandings.

12. Co-operation is sought with other dairy associations, in order by joint action to ward off the dangers which threaten the dairy industry and to promote institutions which may be of service to the Association.

\* It should be noted that every dairy association does not interest itself in all these objects, but only puts such of them into practice as can be suitably applied in its own district.

With regard to the disposal of the product for joint account the following remarks may be added:—

In the province of Friesland, about 22 of the affiliated dairies have also formed a Friesland Co-operative Dairy Produce Export Association, the object of which is to give purchasers guarantees both as regards the purity and the quality of the butter exported by this association. The sales in 1903 amounted to 7,000,000 lbs.

In the province of Drenthe about 22 of the affiliated dairies have established a "Central Mixing and Export Association Drenthe." In the mixing works the butter from the different factories is graded according to quality and made into a uniform product. The object is to afford the small factories of Drenthe an opportunity of at once disposing of their butter abroad. The sales in 1903 amounted to about 650,000 lbs.

The Gelderland-Overijssel Association of Co-operative Dairies

has opened at Zutphen a butter-auction

#### **Butter Auctions.**

room where the butter of all factories affi-

liated to this or other associations is sold by

auction. Both fresh and salt butter are sold

there in kegs of about 20, 40, 55, 110 lbs. Last year nearly 900,000 lbs. were sold in this way. The affiliated association factories are not compelled to send butter for sale by auction.

Such compulsion, however, does exist as regards the auctions of the North Brabant Dairy Association at Eindhoven, and that of the South Netherland Dairy Association at Maastricht. To both these establishments the butter is forwarded in baskets, generally containing 110 lbs. Only fresh butter is accepted. Samples are regularly taken and examined in the laboratory connected with the auction room. The baskets are sealed both at the factory when being forwarded, and by the management at the auction room, to prevent adulteration or fraud.

Each of the above-mentioned butter auctions is under the control of a manager or administrator. The auction authorities have also appointed an agent whose duty consists in buying butter for those who cannot personally attend the sale. This agent is not entitled to make any charge to the purchaser. In order to defray the expenses a small amount per lb. (about one-tenth of a penny) is charged to the sellers by the management, whilst the purchasers have to pay a small amount for the packing. Last year the quantity received at the auctions of the North Brabant Dairy

Association at Eindhoven amounted to about 4,000,000 lbs., and at those of the South Netherland Dairy Association at Maastricht to about 3,500,000 lbs.

In addition to the above-mentioned three butter auctions, established by, or connected with, some Dairy Association, there are similar facilities in Holland for the sale of factory butter at Bois le Duc, Eindhoven, Meppel, Roermond, and Amsterdam. The quantities sold at these auctions, which are more of a private character, are also considerable. The method of sale is practically identical with that followed at the association auctions.

Whilst the butter auctions have continually increased in importance during recent years, a great deal of butter is also disposed of by the factories direct, both in the country and abroad.

During the last few years great efforts have been made to obtain a marketable product. The results are satisfactory and give every hope for the future of the product in the markets of the world.

In most of the large factories, which are all supplied with steam-power, the most modern machinery is used for the preparation of dairy produce by mechanical means. The custom of pasteurizing both the cream and the skim milk is fairly general, and this vastly improves the quality of the butter at certain periods of the year, whilst counteracting the development of disease-producing and other harmful microbes in the milk. In order to make a product that will keep in the warm season of the year, a great many factories have ice-houses attached; these, however, of late years have, in many instances, been replaced by refrigerating and ice-making machinery. In dealing with the milk all kinds of centrifugal systems are used. Especially in those provinces where no half cream cheese or skim cheese is made, a practically complete separation of the cream is aimed at, and it may be said that as a rule hardly  $\frac{1}{10}$  per cent. of fat remains in the separated milk. When it is remembered that this is the  $\frac{1}{30}$  to  $\frac{1}{32}$  part of the quantity of fat present in new milk the result may well be considered satisfactory.

In souring the cream pure cultures are largely used. Of course in the hand-power factories it is not always possible to work entirely according to the newest methods. This is only possible in the larger factories and where steam-power is available. Yet there exists a number of hand-power factories that turn out a very good article. This may be attributed, amongst other causes,

to the careful manipulation and scrupulous cleanliness which is observed. It is indeed a pleasure, both to experts and others who take an interest in this trade, to go the round of many of the steam and hand-power factories, and to observe everywhere with what painstaking care every article used is cleansed and purified, how fresh and pure is the air which blows through the works, and how everything which can be rubbed and polished shines in the old fashion of the Netherlands, showing how well it is understood that to make good butter cleanliness in every way is of the very first importance.

Meanwhile the results obtained from a technical point of view are of no real value to the seller, unless the

**Butter Legislation.** pure article can be protected against depreciation by adulteration. Some idea of what has been done in this direction, by the Netherlands Government, may be gathered from the following statement.

The first Butter Act dates from 1889. It was revised in 1900, various provisions being rendered more stringent. However, the principle on which the Act was based remained undisturbed. It is this: All products resembling butter, in so far as they contain fats, which have not been obtained from milk, are considered to be margarine, and have as such to be transported, exported, exposed for sale, sold, or warehoused for transport, export, or sale under the name of and marked as margarine, whilst, in addition, any place used for the sale, preparation, or warehousing of margarine must bear inscriptions so that the nature of the place can be readily recognised. Where butter and margarine are allowed to be sold together in shops, or other places for the sale of such articles, precautions must be observed to ensure that both are kept separate; the trade in margarine thus being entirely placed under control.

Infringements are punishable by imprisonment for a period not exceeding three or six months or a fine of £25 and £50, as the case may be. If the infringement is committed in connection with goods intended for export abroad, and also in one or two other cases, the above-mentioned maxima are doubled. In case of repetition of the offence, publication of the judgment may be ordered.

In order to enforce the provisions of this Act a separate service has been created, consisting of an inspector and a certain number of visiting inspectors. Samples taken by these officials, or by the

Government and municipal police, of any article resembling butter and not marked according to law, are examined by competent analysts.

The examination of butter until a short time ago took place at the Government Experimental Stations referred to on page 63. In virtue of a Royal Decree of February, 1903, this work was transferred to a Government Dairy Station for the establishment of which, at Leiden, the same Decree provided. This Dairy Station acts for the whole kingdom. This centralisation, and the fact that the Dairy Station makes a speciality of this work, must have satisfactory results. The establishment of this Government Dairy Station has moreover rendered it possible—at any rate much easier—to exercise the supervision on the butter control stations described on page 70.

Although the Butter Acts of 1889 and 1900 have, undoubtedly, benefited the honest butter producer, they have not succeeded, any more than the Margarine Acts in other countries, in putting a stop to the adulteration of butter. This fact has lately given rise to the establishment of institutions called Butter Control Stations by Agricultural Societies or Dairy Associations. They are partly under the supervision of non-interested persons, including as a rule members of the provincial Governments. The first of these institutions was that of the Friesland Agricultural Society.

Seven of these stations have been opened and another is being organised.

At the head of each station is a chemist as director, with as many analysts under him as may be required. Inspectors, acting on instructions of the director, are daily travelling about to take samples of butter and all materials used in its manufacture, in factories or other places where butter is made, or in the shops or salerooms of factories that have submitted to control.

Whenever advisable the director or the inspector takes samples of butter made in his presence in factories or other places as above.

By comparing the composition of butter, samples of which have been taken in the factory in the way described above, with the composition of the samples taken from butter made in the same factory and at the same time of the year, but already brought in

circulation, absolute certainty can be obtained in each case whether or not the butter has been adulterated. The analysis of both samples should give the same results absolutely, the varying chemical composition of butter being no longer a factor in the question. Even the slightest fraud will be immediately discovered by this system of control.

Moreover a continual and stringent supervision is exercised to make sure that in the factories no fats are stored which can serve for the adulteration of butter.

The Netherlands Government, alive to the great importance of maintaining the reputation of Dutch butter in the markets of the world, has considered it advisable to give these Butter Control Stations an official character, and, in order to ensure their continuance, to assist them financially. The Government is convinced that this will considerably increase the confidence in these institutions.

Not only this material assistance, but especially its moral effect, is greatly appreciated by the stations, and they were readily prepared, therefore, to accept the conditions which the Government thought it necessary to impose.

Were such conditions necessary?

The Government would have been quite justified in guaranteeing the reliability of private control, considering: 1st, the object with which the Butter Control Stations were created; 2nd, the reputation of the persons who took the initiative and those who are at the head of these institutions; 3rd, the great importance to the members that each individually shall strictly observe the regulations; 4th, the very great injury they might inflict on themselves by the least action suggestive of fraud; and, 5th, the right of members to blackball any one applying for admission in cases where he appears to them undesirable, so as to exclude untrustworthy persons.

Yet the Government were of opinion that in order to render their recognition more valuable, these guarantees should not be relied on exclusively.

The following were among the conditions imposed:—

1. That the regulations and arrangements of the station should be such as to render the supervision of the affiliated members always and in every respect entirely satisfactory.

2. That the regulations give the Government the necessary power to enable them to exercise the same supervision as is exercised by the management of the station and at the same time to control the management itself.

3. That the regulations are consequently subject to the approval of the Government.

With a view to the above and to the desirability of securing the greatest possible uniformity, both in the working arrangements of the stations and the conditions of membership, the Government has thought fit to prescribe a few general rules, to which the regulations must conform.

These general rules are the following:—

General rules to which the stations must conform in order to be placed under State supervision.	<p><i>a.</i> Butter merchants as well as butter producers may be members of the station.</p> <p><i>b.</i> The members must be of good repute and possess full civil rights. The station or the institution forming it should be incorporated.</p>
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*c.* Members of the station shall not either directly or indirectly be connected with the manufacture of, or the trade in, margarine (margarine in the sense of the Butter Act) or other edible fats or oils, either mixed or not with other substances, which may be used for the adulteration of natural butter, and a list of which is published annually by the Government.

They shall not transport, order to be transported, import, or export the said fats or oils, nor store them at their works, in their cellars, warehouses, shops, or factory enclosures, or in any manufacturing, sale, or store-rooms.

*d.* Butter merchants shall not buy any other butter, and butter producers shall not buy any additional butter they may require to complete orders except that which comes from a producer being a member of one of the stations under Government supervision. To any butter or additional butter purchased contrary to this provision, the prohibitory regulations regarding fats and oils referred to under *c*, 2nd paragraph, shall likewise apply.

This also applies to the members of the management, managers, or members of firms owning factories.



*e.* Butter producers are bound to carefully register in such manner as the Government shall approve:—

The quantity of butter produced by them.

All lots of butter of 5 kilos (about 11 lbs.) or more, forwarded or delivered by them, as well as the total quantity forwarded or delivered by them in retail.

All additional lots of butter purchased by them.

The names and addresses of all persons to whom 5 or more kilos of butter were forwarded or delivered, and of those from whom additional butter was purchased.

*f.* Butter merchants shall, daily, carefully register in such a manner as the Government shall approve:—

All lots of butter received by them.

All lots of butter of 5 kilos or more forwarded or delivered, as well as the total quantity forwarded or delivered by them in their retail business.

The names and addresses of those to whom they sent or delivered 5 or more kilos of butter and from whom they bought additional butter.

*g.* Butter producers and butter merchants shall at all times and without any reserve give free access to all places referred to under *c*, 2nd paragraph, to all duly-appointed persons acting under the authority of the control station or of the Government.

They are bound to furnish all information these persons may require; to allow them to inspect all lists kept by them, including those kept in conformity with the provisions of sections *e* and *f*; permit them to take samples free of charge, of butter as well as of the raw materials of which it was made; and assist them in so doing, if required.

*h.* Unless provided for in another way the packing of butter has to be stamped with a mark approved by the Government. This mark is intended as an indication for the inspectors of the Control station and for the persons charged with the Government supervision of this control.

The merchandise itself should bear a further mark. This is a mark of guarantee, and it warrants the purchaser that he receives butter the manufacture of which has taken place under control. This mark is identical for every Control Station under Government supervision. It consists of the Arms of the Netherlands over which the word "Nederlandsche" (Netherlands) and under which the word "Botercontrole" (Butter control) and in smaller characters "onder

Rijkstoezicht" (under Government Supervision) are placed. By the side of this mark some further indication has to be made of the Control station concerned, and whatever the Department may further consider necessary to identify the origin of the merchandise. This mark of guarantee will be placed on paper to be obtained on certain conditions from the Government at the charge of the persons concerned.

Any member obtaining possession of the paper bearing this mark is responsible for its exclusive use for the butter made or sold by him.

The mark of guarantee is copied hereunder.



Producers and merchants are entitled to use their own mark in addition to this general mark.

*i.* The control exercised by the station—and likewise the Government supervision—shall, if considered advisable by the Department, extend to other matters beyond the guarantee against fraud for which the Butter Act provides (such as the guarantee of a not excessive percentage of water).

*j.* A sufficiently heavy penalty shall be fixed for such producers and merchants as act in contravention of any of the regulations *sub c* to *g* inclusive, or the provisions in the third paragraph under *h*, or for such as, in the opinion of the station concerned, wilfully contravene the stipulations imposed by virtue of *sub i*.

Such persons, unless the Agricultural Department considers the above-mentioned penalty sufficient, shall be irrevocably struck off the roll of members, notice hereof to be given to whomsoever it may concern. If, however, any of the stipulations under *c* are contravened, no such reserve is possible, the persons offending being in these cases always struck off the roll and their names published.

The penalty referred to in the first paragraph of this section shall also apply to such producers and merchants as do not fulfil the conditions laid down in the 1st and 2nd paragraphs under *h*.

k. The chemical and further examination of samples and everything connected therewith shall be carried out in conformity with the rules prescribed by the Government.

l. Any station desiring to be placed under Government supervision shall, in addition to its regulations, &c., be required to furnish a complete list of the members composing the management, of the staff, and of the affiliated members. The station shall also submit estimates of income and expenditure.

m. Any station placed under Government supervision shall, at all times, furnish complete information, to the Department, of all projected amendments of or additions to its regulations, as well as of any changes in its staff and management, and of the names of all new members and of all members who may have been struck off the roll with a statement of the reasons for such action. All such amendments of and additions to its regulations and all new appointments shall require the sanction of the Government, if the station wishes to retain Government supervision.

The station shall send every year accounts of its income and expenditure.

n. Any publications of stations, under Government supervision intended for distribution abroad, shall require the approval of the Government.

o. The directors of all stations under Government supervision shall communicate every month, to the director of the Government Dairy Station, at Leiden, all figures obtained as a result of their analyses or enquiries.

Any person, who without authority uses, or who abuses the aforesaid marks will be prosecuted in accordance with the penal law.

Provisions in the spirit of these general rules were to a great extent already included in the regulations of the Control stations, previous to arrangements being made for Government supervision. Since the Government promised assistance, the number of members of these stations has greatly increased.

Purchasers of butter and others interested can at all times obtain from these stations the names of affiliated producers and merchants, and also every desired information respecting the system of control.

## PIG BREEDING IN IRELAND.

The pig has long played a prominent part in the economy of rural Ireland. In most of the poorer districts, and even in the more fertile localities, swine are bred and fed in considerable numbers, and the extent to which small farmers and cottagers depend upon them for "making ends meet" at certain critical periods of the year has become proverbial. A good idea of the importance of the pig-breeding industry in Ireland as compared with other parts of the kingdom may be gathered from the fact that while there are about 300 pigs per 1,000 of population in this country there are only 59 in England and 28 in Scotland.

Of late years considerable progress has been made in the improvement of the pigs bred in Ireland, but that there is room for much further improvement cannot be gainsaid. Many of the animals still offered for sale in our leading fairs and markets are of a very inferior type—heavy shouldered, narrow backed, light quartered, suitable only for the production of a coarse quality of meat, for which, even in the best of times, only an unremunerative price can be obtained.

For a number of years past Irish pig products have been meeting with keen competition from abroad, more especially from Denmark and Canada. In both these countries special attention is being devoted not only to the breeding but also to the feeding of pigs calculated to meet the requirements of the best English markets. Large sums of money are spent in the introduction for breeding purposes of boars and sows of an improved type, and careful experiments are conducted to determine how pigs thus bred can be fed to most advantage, *i.e.*, so as to give a remunerative return to the breeder, while enabling the owner to produce meat of such a quality as will realise the highest price in the best markets.

In order to compete successfully with their foreign rivals, Irish

**The Type of Pig** pig breeders must bestir themselves and  
**to Breed.** strive to produce pigs that will—

- (1.) Enable our curers to maintain their supremacy in the world's best markets; and
- (2.) Leave the feeder a profitable return for the food consumed.

Pigs capable of fulfilling these conditions are to be obtained in suitable strains of the Large White Yorkshire breed, or in crosses

between selected boars of that breed and the ordinary sows met with throughout the country. Recent experience has gone to show that no other pig is so well qualified to meet the requirements of the feeder and owner in Ireland as the Large York. Among other desirable points, good specimens of the breed possess the following:—

- (1.) A neat head ;
- (2.) Light neck and shoulders ;
- (3.) A good girth and plenty of depth “ through the heart ” ;
- (4.) Well sprung ribs with moderate depth of side ;
- (5.) Great length of body ;
- (6.) Thick loins ;
- (7.) Stout thighs ;
- (8.) Short legs ;
- (9.) Long silky hair ; and
- (10.) A moderately thick skin free from wrinkles.

The head of a pig is, like the head of a horse or cow, a very important index of the character of the animal.

**1. The Head.** The pig that is very long in the head is usually narrow between the eyes, and seldom has a very sound constitution. On the other hand the pig that is very short in the head may possibly be very thrifty, but is certain to be too thick in the neck and heavy in the shoulders. The expression “ neat in the head ” means that the animal has neither too long nor too short a nose, but a nice shapely-looking face with bright, yet mild, eyes and a broad forehead. The ears should be fairly large, soft and pliable, and they should fall a little to the front. It should be remembered that a very long-nosed pig usually is a coarse animal with a heavy head and too much bone. On the other hand, a pig having a short and turned up nose is generally too heavy in the shoulders and too light in the hind quarters. A mean between these two types gives the class of pig best suited to the requirements of the Irish feeder.

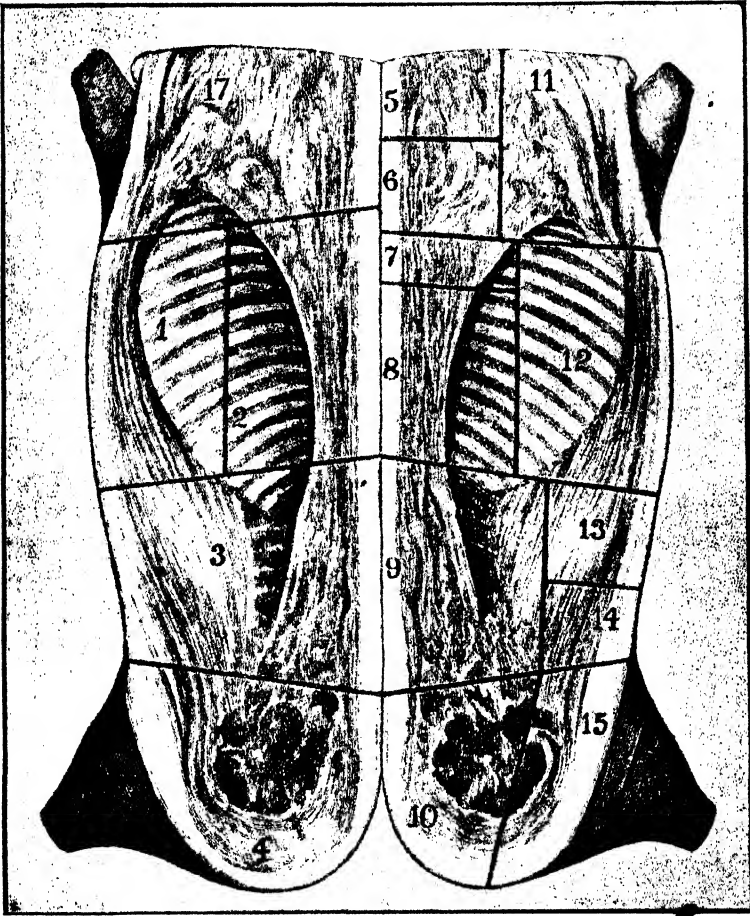
The coarsest parts of a side of bacon, and those which fetch the lowest price, are the neck and shoulders.

**2. Neck and Shoulders.** The lighter these parts the better the side, and the higher the price it will command.

Excellence in these points should not, however, be confounded with a scraggy neck. The pig must be looked at not alone from a bacon curer's point of view ; it also deserves serious consideration from the point of view of the breeder and

feeder. The object should be to produce the best all-round pig, and to do this the farmer and curer must agree to "give and take." What exactly suits the curer may not entirely suit the breeder or

DIAGRAM SHOWING MODEL SIDES OF BACON.



(After Spencer.)

INDEX to PARTS, with CURRENT PRICES, per lb.

1. Streaky Quarter ...	11d.	10. Fillet ...	10d.
2. Rib Quarter .	11d.	11. Shoulder ...	6d.
3. Middle Quarter ...	8½d.	12. Prime Streaky ...	11d.
4. Ham Quarter ...	8½d.	13. Thin Streaky ...	8½d.
5. End of Neck ...	7½d.	14. Flank ...	5d.
6. Middle of Neck ...	8½d.	15. Middle of Gammon	11d.
7. Thick Back and Sides	10d.	16. Knuckle of Gammon	7d.
8. Prime Back and Ribs	11d.	17. Fore End ...	6d.
9. Loin ...	10d.		

feeder, and *vice versa*. We should therefore strive for a judicious compromise. An animal with a light neck is no doubt acceptable

to the curer, but such an animal invariably has a poor appetite and a delicate constitution. The desired pig must be as light in the neck and shoulders as is consistent with general thriftiness. If the neck is light so, as a rule, are the shoulders. A heavy jowl is an objectionable feature of some English-bred pigs, and breeders, in importing animals from the other side of the Channel, should be careful to guard against this defect.

The diagram given on the previous page will serve to convey an excellent idea of the desirability of having certain parts of the body improved and increased in weight and other parts correspondingly reduced, provided such reduction can be effected without detriment to constitution or fecundity. If carefully studied, the diagram will be found to afford instructive confirmation of the observations already made in reference to the relative values of the head, neck, and shoulders in comparison with other parts of the body. The fore end, marked No. 17, is the least valuable part of the side of bacon; it is therefore desirable to reduce it in weight as much as possible.

Considered from the bacon-curer's and consumer's point of view, a pig that is deep in the heart and round or  
**3. and 4. Girth and well sprung in the ribs, will of necessity**  
**Fulness of Ribs. produce a larger quantity of first-class bacon**  
 (viz, "prime back and ribs" and "prime streaky") than one that is not well developed in these points. It is, therefore, desirable to add as much as possible to the weight of these parts. A pig possessing these characteristics will certainly be a good feeder, and as a rule be able to assimilate a maximum proportion of the food consumed. Roundness of rib nearly always indicates a good constitution; flatness of rib the reverse. A pig having well-sprung ribs will carry considerably more meat on the bone and have the ribs well covered with flesh. All things considered, the pig that is deep in the heart and round in the rib will be found to suit breeder, curer, and consumer alike.

Long sides or flitches of bacon are desired by the curers, and moreover, long sides are usually less fat than  
**5. Great Length short plump sides, and therefore better meet**  
**of Body. the market requirements. In the case, too,**  
 of brood sows, a long body affords more room for the young pigs before they are born, and permits a great development of the udder.

A wide well-knit loin is a point of great importance in a pig as well as in other farm animals. A pig

**6. Thick Loins.** with a good loin is almost invariably well ribbed up and well sprung in the ribs. It is usually able to digest a large amount of food and has a strong constitution. On reference to the diagram it will be seen that piece No. 9 (the loin) is also a high priced "cut." It is therefore important that the weight of this part should be maintained. A slack or weak loined animal is never a good one; it is weak in constitution, unthrifty, and hence an unprofitable animal. The extensions of the loin piece (Nos. 13 and 14) are well known to be low priced because of their thinness. Were the thickness of the flank increased the price would rise in proportion. In the thin streaky portion the fat and the lean should alternate, as in the traditional piece of bacon mentioned by Carleton, which the farmer tried to produce by feeding his pig one day and starving him the next. Irish pigs possess this alternate fat and lean in the flank more markedly than the average English pigs. Again, the pig which is good in the loin and thick in parts 13 and 14 is invariably a good feeder and thrifty, and is often described by the buyer as a good weigher.

Stout thighs mean well developed hams, which in the case of pigs killed for what is known as the "ham and  
**7. and 8. Stout Thighs** middle" trade are the most valuable of all  
**and Short Legs.** the cuts. Good plump hams add a great deal to the dead weight of the pig; moreover, a pig that is long in the leg is nearly always flat in the hams. A long-legged, flat-hammed pig is generally light in the loins and "tucked up," and we have already seen how important is the possession of good thick loins.

An abundance of silky hair indicates strength of constitution, and is the most certain sign of a disposition  
**9. Long Silky Hair.** to produce the lean meat so much desired by the consumer. The absence of hair is, as a rule, the result of close breeding, which unfortunately prevails in many districts. A sow, it must be remembered, usually produces two broods in a year, whereas the mare, cow or ewe produces young only once in the same period. In the case of pigs there is, therefore, more danger of the sire being mated with near relations than is the case with other domestic animals. Owing to this danger the sire in a large herd or the boar kept in a country district for the



service of sows in the neighbourhood should be frequently changed, for the animals produced by close breeding are of inferior quality, often lacking in size, especially weak in constitution, and having very little hair.

The skin should be moderately thick and free from wrinkles, as a wrinkled skin spoils the appearance of a side of bacon, and consequently affects its value.

#### 10. Skin.

### CHARACTERISTICS OF OTHER BREEDS OF PIGS.

The Small White Yorkshire, though very interesting as an illustration of what a skilful breeder can accom-

**The Small York.** plish in the moulding of animal form, is altogether unsuited to present-day requirements. Its great drawback is excessive fatness, or rather, a lack of lean meat in proportion to fat. In Ireland the introduction of this breed and the encouragement given to it by agricultural societies had the effect of materially retarding the progress of other pure breeds for a number of years. This arose from the fact that when tried by the farmer the Small York was found quite unsuited to the requirements of the Irish trade, with the result that breeders and feeders developed a distinct prejudice not only against it, but against all other pure bred pigs.

Between the Large White and the Small White breeds there is, of course, a great difference. By some

**The Middle York.** breeders the Large White was considered too big, and by others the Small White was thought to be lacking in size. It was, therefore, thought desirable to produce a breed which, it was hoped, would combine all the qualities that were esteemed in both. Consequently, these two breeds were crossed, and a new breed known as the Middle York was the result. In size the Middle approaches more closely to the Large than to the Small York. The former has, however, been so much improved in recent years that there is now very little demand for the Middle York.

The Berkshire is the best known of the coloured breeds, and it is very popular in parts of England. It

**The Berkshire.** attains a good size when fully grown. It is suitable for all classes of trade—as a porker when eight or ten stone in weight, and as good general purpose

pig at a weight of twelve stone. It is prolific and hardy, and thrives on almost any kind of food. The Berkshire has never been favourably regarded by Irish breeders. The most serious objections urged against it are that it is a slow grower when young, and is difficult to dispose of as a suckling pig. Objection is also taken to its colour, particularly where white pigs are usually kept. The Berkshire crosses well with the Large Yorkshire and with such sows as are commonly met with in the country, and so good is the quality of the meat of these cross-bred pigs that one well-known Irish curer states that his ideal of the perfect bacon-curer's pig would be "a white Berkshire," i.e., a pig that would combine the excellent quality of the Berkshire with the white skin of the Large York.

Like the Berkshire, the Tamworth is a breed which has never achieved much popularity in Ireland. Of

**The Tamworth.** late years it has been much improved, and has been favourably spoken of by bacon-curers owing to the high quality of its meat. The Tamworth is comparatively slow in attaining maturity, but when full grown its meat is of fine quality and delicately flavoured. Its chief value is as a bacon pig, but as it is slow in coming to maturity it is not found so profitable as the Large York. It makes a good cross, particularly with the Berkshire or with any breed or strain that has too great a tendency to produce fat. The Tamworth is the only breed in these countries having a red skin.

The Large Black has recently been recognised as a pure breed.

**The Large Black.** It resembles the Large York in many respects. As its name implies, it is black in colour, and it has the reputation of being a quick grower, while the sows of this breed are said to be good mothers.

#### SELECTION OF BREEDING STOCK.

Having briefly discussed the characteristics of the pig that it is desirable to breed, the next matter to be considered is how such a pig is to be produced. The choice of the boar is of greatest importance, for it must not be forgotten

**The Boar.** that the sire is half the herd. In the selection of the sire, the points already enumerated as constituting excellence in the bacon-curer's pig must be taken into account. In the case of young boars, the age of the animal must always be borne in mind. It is

very difficult to judge boars at from three to five months old. When purchasing a boar of this age, it is therefore very desirable to see his sire and dam. If, so far as can be judged in his as yet immature state, the young boar possesses the characteristics sought for, and an inspection of his parents shows them to be of the desired type, the probability is all in favour of the animal developing along the same lines.

In the selection of sows there are a few points which should be sought for in addition to those mentioned

**The Sow.** as requisite in the boar. Sows should be docile and have at least twelve teats of equal size, evenly placed, and carried well forward on the belly. Large flat teats are invariably blind, *i.e.*, they possess no milk duct. Young sows should also be of good size and quality. Care should be taken to ascertain if their dams have been good milkers, as this quality is hereditary. A young sow should get plenty of exercise until she is ready for breeding, which is at the age of about eight months. The best periods of the year for mating sows with the boar are the end of April and September. Pigs farrowed in October, November, and December seldom turn out well.

During the first eight weeks after service, the sow may be allowed to run on grass and should receive a limited

**Care of Brood Sows.** amount of food; for the last eight weeks she should be treated more generously so that she may be in good condition, but not too fat, at the time of farrowing. It is of the greatest importance that a sow should have a full litter the first time, so that all her teats may be utilised, as teats which are not used by the first litter never afterwards yield as much milk as those that have been so employed. The length of time that a brood sow may be profitably kept is determined by her capacity and power of giving a regular supply of milk for her young; shortly, it may be said that she should be kept as long as she breeds and milks well. Continued selection and retention of the best young sows for breeding purposes is one of the most effective methods of improving a herd of pigs. The opinion held by many that pigs from the first litter of a young sow are inferior to those from subsequent litters is not well founded. Quite as good pigs can be obtained from a young sow, provided she is well grown before producing her litter, as from the same sow at a later date. The keeping of sows for the production of pigs in-

tended for sale at an early age is a system practised by many. Coarse-boned, heavy-eared, ill-shaped pigs look larger at the age of eight weeks than well-shaped ones. Such animals do not, however, meet the requirements of the trade, and are therefore not so profitable to the breeder. Many persons who feed pigs are of opinion that animals which are plump and nicely shaped at an early age do not grow to a good size. No more mistaken view could possibly be held.

In some districts store pigs are allowed to run on grass and feed on house refuse, if available, and a little purchased meals. The cost of rearing on this system is not very great, but the general opinion is now in favour of a method which yields a quicker return.

The pig that commands the highest price on the market at the present time is an animal which when well finished and not too fat weighs twelve stone killed and dressed, or about 15½ to 16 stone living. Such an animal is known in the trade as a "sizeable" bacon pig, and is one suitable for the London and other English markets. A good pig ought to attain this weight at the age of seven months.

In order to obtain profitable returns from pig feeding, the feeder should acquire a knowledge of the constituent parts of the many foods employed. The pig takes in its food more quickly and consequently masticates it less perfectly than other domesticated animals. Hence the food supplied to a pig should be of a digestible nature, and in such a form as to make only a small demand on the digestive organs. Most foods lack some important constituents and contain others in too limited a quantity or in greater abundance than is required. Therefore, if certain foods are given exclusively—for instance, Indian meal, which contains an insufficient quantity of nitrogen—an unhealthy state of the system is certain to be produced.

Feeding upon one article, therefore, no matter how good it may be, is not desirable, and in practice it has been found that a mixed ration best suits the requirements of a pig and is most economical. Experiments have shown another defect in feeding entirely upon one class of food; the digestive

organs of the animal cannot extract the whole of the nutritive properties of such a food, and a large percentage passes into the manure without benefiting the animal in the least degree.

Temperature has a great effect on fattening animals. Where farm stock are kept in cold houses it be-

**How Warmth** comes necessary to increase the quantity of  
**economises Food.** food in order to maintain the warmth of the body. In many cases pig feeders pay

little attention to this matter, and rather than go to the expense of providing warm sties for the accommodation of their animals in winter they often adopt the ultimately more expensive plan of giving additional food to keep up the normal heat of the body.

Pigs give the best results when fed regularly. During the time

**Foods for Brood** the sow is rearing her litter she should re-  
**Sows.** ceive as much good food as she will take ; such food may consist of boiled potatoes,

Indian meal porridge, pollard, bran and skim milk. At three weeks old the young pigs begin to eat. At this time they should be supplied with new milk, for which after a short time skim milk may be gradually substituted. Later a little pollard and boiled potatoes may be added to the milk and given twice or three times daily. At the age of eight weeks the young pigs may be weaned. After weaning they should be provided with food in a sloppy condition, and provision should also be made for allowing them a good deal of exercise. When they reach a weight of about 1 cwt. the amount of exercise allowed should be curtailed, and the food then given

**Foods for Fattening** should consist chiefly of boiled potatoes, well  
**Pigs.** broken and mixed, when hot, with a quantity of raw Indian meal and pollard, or

barley meal. After the pigs have eaten as much as they appear to require, a small quantity of buttermilk, skim milk, or kitchen refuse (if available) may be added to induce them to clean up all the food given. The quantity of food which a pig should receive is just what the animal will eat up clean. Turnips and mangels are sometimes given, but potatoes are to be preferred. Pigs being fattened should be fed three times a day. This is a point which may be regarded as very simple, yet it is one of great importance. It is

most essential that pigs should be fed regularly, and whether the food is given twice or three times a day, it **Regularity in Feeding.** should be given invariably at the same hours. The food ought to be brought to a temperature of 90° F. by direct heating or by the aid of hot water, for when this is done much of the heat-giving matter of the food is saved for the production of fat. The amount of food required to produce a certain increase in weight at different ages varies. Carefully conducted experiments have clearly proved that as the weight of the pig increases the amount of food required to produce a given increase becomes larger. Irish pig-feeders, as a rule, believe that less food is required as the period of fattening advances, but the contrary is really the case.

The proper housing of pigs is deserving of special attention, as no part of their management has a greater **Housing.** effect on their health and general improvement. It seems so natural to hear pigs abused for their dirty ways that it is hard to conceive that they are in some respects much more cleanly in their habits when in confinement than other farm animals. They are more attached to warmth and comfort than any other animal under the farmer's charge. If the movements of pigs in confinement are noticed, the cleanly habits and the ideas of comfort here referred to will soon become apparent. The animals invariably use one corner of the sty for their excrements, and reserve a place, which is kept as clean as possible, to lie down on. Pigs may be seen carrying clean straw in their mouths to make their beds dry and comfortable. It is fortunate, perhaps, that they can accommodate themselves (at some loss to their owners, however) to the many forms of neglect to which they are often subjected, but it should never be forgotten that no other animals give a better return for additional comfort supplied or for liberal treatment bestowed upon them.

The common practice of providing pigs with small sties, each with its small yard, is not always a desirable **The best form of** one to follow. It may at least be often departed from with advantage. Owing to its **Piggery.** low doorway, the usual sty has to be crept into when it requires cleaning out, and the pigs when wanted for inspection generally run inside. The arrangement, moreover, is objectionable because such a building is not conducive to the comfort or health of the animals—being too warm in summer and too

cold in winter. The best form of piggery is a box (or a series of boxes), say 9ft. by 9ft. or 10ft. by 8ft., with a feeding passage in front. A "box" of this size would afford accommodation for a sow with litter, or for four fattening pigs. The walls of such a box should be six feet high, with an opening under the eaves for the admission of the sun and air. In cold weather this aperture could be closed with a shutter. The "rooting-up" habits so deeply implanted in pigs necessitate the provision of a snout-proof floor. The best material for this purpose is concrete or asphalt. The drainage should be taken superficially, and an open channel should carry all the liquid matter either to the manure heap or the liquid tank. In sties that are used for breeding sows provision should be made for preventing the animals from lying against the walls and crushing their young. This is easily done by fixing a 2-inch plank about 6 inches wide all round the walls 8 inches from the floor.

<p>The best arrangement for feeding is a trough which allows the</p> <p style="text-align: center;"><b>Feeding</b></p> <p style="text-align: center;"><b>Arrangements.</b></p>	<p>food to be introduced from the feeding passage, and which serves the double purpose of confining the animals and keeping them back while the food is being put in.</p>
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This arrangement consists of a strong shutter suspended from a rail to hang exactly over the centre of the trough; when the food is being put in, the shutter is pushed inwards, and a bolt drops, throwing the whole of the trough open to the passage. By bringing the shutter back and bolting it to the outer side of the trough, the whole of the trough is placed at the service of the pigs. Of course, everything must be strong for an arrangement of this kind, and where wood is used, it should be of oak and protected by iron hooping or sheet-iron.

Pigs put up for fattening will be better if confined to the pens entirely, where they will be warmer than in the ordinary sty. Breeding sows and young growing animals which are to be fed for bacon must have a run out. The best way of securing this is to have a grass paddock close to the sty, where the animals may be allowed to run for some time each day when exercise is required.

## COMMERCIAL EDUCATION.

A report on commercial instruction in Germany,\* prepared by Dr. Frederic Rose, His Majesty's Consul at Stuttgart, has recently been issued. From this report it appears that the movement for the provision of commercial instruction in Germany dates from the beginning of the eighteenth century, and manifested itself in the addition of commercial courses and classes to various schools—especially “real-schools”—and in the foundation of independent schools for commercial instruction.

Two of the earliest examples of the former category were the “Mathematical and Mechanical Real-school” founded by Semler at Halle in the beginning, and the “Real-school” founded by Hecker at Berlin about the middle, of the eighteenth century. Both were eventually closed after a brief existence, but the principles inherent in their organisation survived, and were successfully applied to other “real-schools” founded in later years.

### Early History of German Commercial Instruction.

The schools of the latter category were sub-divided into schools with a shorter period of commercial instruction for pupils who had already acquired a certain degree of preliminary education, and into schools with a longer period of instruction not only in purely commercial but also in general educational subjects necessary for commercial men, with special reference to individual industrial requirements. The most important schools of this description during the eighteenth and the first half of the nineteenth centuries were those at Hamburg, Magdeburg, and Berlin.

Since then the number of commercial schools of all descriptions has multiplied enormously and in all directions. The scope of the instruction, too, has been broadened and deepened so as to provide commercial instruction of every possible grade, from the highest facilities afforded by the commercial universities to the lowest afforded by the commercial evening continuation schools.

Although the divergent educational views, which prevail in the States composing the German Empire, render any accurate comparison extremely difficult, the German commercial schools may

\* Foreign Office, Diplomatic and Consular Reports. Miscellaneous Series, No. 619. September, 1904. Price 5½d.



be roughly divided into three categories, those providing higher, secondary, and lower commercial instruction. The line of demarcation between the higher and middle is distinct, that between the middle and lower much less definite, and is in many cases indistinguishable. The schools for middle and lower commercial instruction are the most numerous and important; the schools for higher commercial instruction are of too recent foundation to enable a final judgment to be passed upon their results and influence.

Dr. Rose gives details of the educational qualifications required for entrance to the various kinds of commercial schools, and then proceeds to describe the working of the various commercial universities in Germany. All these have been founded within the last six years, and mark a further step in the

#### **Higher Commercial Instruction.**

development of German educational training. Their aim is to afford persons engaged in business and industry on a large scale, masters at commercial schools, administration officials, bank officials, Consular officials, secretaries to Chambers of Commerce, and all such persons, a deeper and broader measure of instruction in commercial and national economical matters than that provided by the various commercial schools. The special province of the commercial universities lies less in the mere acquisition of commercial-technical knowledge and attainments for immediate practical detailed application, than in the attempt to provide a general mental schooling for the higher branches of the commercial profession. These Universities are intended to awaken and develop the mental faculties of a merchant, to enable him to grasp the inner working and meaning of national and international economy, and to understand and judge its causes and results, its temporary and permanent phenomena; as far as commercial officials are concerned, it is the object of the commercial university to impart general knowledge and understanding of the economic conditions of commerce and industry with their manifold aims and requirements.

This measure of university education (*Akademische Bildung*) is also intended to raise the social position of the mercantile profession, and to increase its political importance and influence in public life.

Generally speaking the instruction is arranged to include the following subjects:—Political economy, commercial history and

geography, commercial law in all its aspects, the organisation and management of commercial undertakings and their technical details, industrial law, financial science, bank, exchange, monetary and credit operations, State and administrative law, and so forth.

A typical university of this class is that of Frankfort-on-Main.

**A Typical Commercial University.** The commercial university at Frankfort-on-the-Main was opened on October 21, 1901. It also bears the name of "Academy of Social and Commercial Science," and is under the supervision of the Prussian Minister of Industry and Commerce. It is not only intended for the higher commercial instruction of persons engaged in, or wishing to devote themselves to the higher branches of industry and commerce, but affords opportunities for study in economic, political, legal and social subjects. These latter subjects have been added for the benefit of administrative and legal officials, barristers, solicitors and members of other learned professions who wish to study them from the standpoint of economic development. In this respect the institute at Frankfort-on-Main differs from the other German commercial universities, and hence its second designation "academy of social and commercial science."

A further aim of the university is the training of future masters of commercial, industrial and continuation schools, and also of masters and students of modern languages.

The students are divided into two principal categories, fully qualified students for at least eight hours per week or for a single course of lectures (Besucher and Hospitanten) with the necessary preliminary educational qualifications, and so-called "hearers" (Hörer) with inferior educational qualifications, and who are at least twenty years old. Entrance to the university is open to women as fully qualified students or as "hearers," provided they possess the necessary educational qualifications.

The following categories of persons are admitted as fully qualified students:—

(1.) Students from German classical, technical, commercial and other universities; pupils who have completed the full courses of a "gymnasium," "real-gymnasium," or "real-school"; pupils who

have completed the full courses of the Bavarian industrial schools and of some higher commercial schools.

(2.) Persons engaged in industry and commerce, insurance officials, and other persons engaged in a definite calling who have acquired the "one year military service" educational standard and have had at least two years' practical experience of their occupation. Apprentices are not admitted.

(3.) Masters who have been trained in teaching seminaries and have passed their second examination.

(4.) Foreigners whose preliminary education is considered satisfactory.

The lectures and exercises are sub-divided into the ordinary lectures and exercises and the special exercises held in the seminaries. Only advanced students are admitted to the latter. At present six of these seminaries have been created: for national economy, law, insurance science, statistics, modern languages, and for the training of masters in commercial subjects. The instruction given in the seminaries is of an advanced, detailed and thorough nature, and combined with special exercises and so-called "colloquia."

In a "colloquium" students are asked and answer questions, and are encouraged to submit their own views and difficulties to the professor: it is a kind of coaching system.

The following table gives a list of the lectures and other work for the summer term of 1904:—

Subject or Seminary.	Lectures or Exercises.	Hours per Week.
National economy ...	Introduction to national economy (lectures and debate).	4
	Private and national economy ... ..	1
	Principles of money and credit ... ..	1
	Socialism and communism ... ..	1
	Practical or special national economy ... ..	4
	Internal commercial politics, including exchange affairs.	1
	Trade and trade politics, with special reference to transmarine trade.	2
	Constitution and administration of industrial works.	1
	Communal social politics ... ..	2
	Public and private philanthropy ... ..	1
	Politico-economic discussion on matters inspected during excursions.	1
	Exercises in social practice in connection with the social museum.	2
	Practical exercises in poor law administration ...	1

LIST OF LECTURES, &c.—*continued.*

Subject or Seminary.	Lectures or Exercises.	Hours per Week.
National economic seminary	Exercises relating to the modern economic development of the principal civilised countries. Practical national economy for lawyers ... Written and vocal exercises ... .. National economic and technical economic exercises.	2 2 2 2
Law and Consular service	German Civil Code (law regarding debt and fundamental principles). German Civil Code (law of inheritance) ... General and Imperial State Law ... .. International law ... .. Consular service ... ..	2 1 2 2 3
Legal seminary ... ..	Introduction to the science of law, and the foundations of public law (exercises, for laymen). Exercises in exchange law ... .. Drawing up of civil and criminal cases (for professional lawyers). Exercises in public railway law ... .. Exercises in private railway law ... ..	1 1 1 1 1
Insurance and statistics ...	Introduction to differential and integral calculus, Part II. Fundamental principles of the German insurance law for workmen	1 1
Insurance seminary ...	The technics of insurance (for advanced pupils) Exercises in private insurance law ... ..	1 1
Statistical seminary ...	Statistical "colloquium" ... .. Statistics of economic undertakings ... ..	1 1
Commercial science ..	Commercial calculations ... .. Current accounts .. .. Principles of book-keeping by double entry ... Exercises in book-keeping ... .. American book-keeping and banking business correspondence. Balance sheets ... .. Law of exchange ... .. Economic geography of the United States of North America. Exercises in economic geography ... .. Knowledge of the products of the vegetable world Introduction to French commercial correspondence Introduction to English commercial correspondence. French commercial correspondence ... .. English commercial correspondence ... .. French commercial correspondence for advanced students; letters in banking and exchange business, with a systematic explanation of the terminology of banking and exchange operations. The same for English commercial correspondence Study of French commercial publications ... Study of English commercial publications ... Exercises in Spanish commercial correspondence	3 2 3 2 3 1 2 1½ 2 1 2 2 2 1 1 1 1 2 2 1
Commercial science seminary.	Various conferences and exercises ... ..	2
Seminary for masters at commercial schools.	Treatment of national economic subjects in school instruction. The technics of commerce for schools ... ..	2 1½

LIST OF LECTURES, &c.—*continued.*

Subject or Seminary.	Lectures or Exercises.	Hours per Week.
Philosophy, history of literature, and modern languages.	Modern psychology ... ..	2
	History of German literature ... ..	2
	History of English literature in the seventeenth century.	1
	History of French literature in the nineteenth century.	1
	Montaigne, life and works ... ..	1
	Gabriele d'Annunzio (biographical-literary introduction, translation and interpretation of one of his works).	1
	Phonetics of modern French, with exercises ...	2
	Modern English, easy selections ... ..	2
	Modern English, difficult selections ... ..	2
	French reading and exercises for students of modern philology.	4
	Easy French reading and exercises ... ..	2
	French reading and exercises for more advanced students.	2
	Introduction to Italian ... ..	2
	Spanish, continuation and conclusion of the course for beginners.	2
	Spanish reading for advanced students, ... ..	1
Seminary for modern languages.	English section—	
	Division I for masters at higher schools ...	2
	Division II for students of modern languages	2
	Section for languages of Latin origin—	
Technics and auxiliary sciences.	Division I for masters at higher schools ...	2
	Division II for students of modern languages	2
	General mechanical engineering, with excursions	2
	Inorganic experimental chemistry, metals, with special reference to their technology.	1
	Chemical laboratory, production of chemical preparations, introduction to qualitative and quantitative analysis.	6
	Chemical laboratory, practical work in inorganic, organic and technical chemistry and gas analysis; introduction to independent research work.	40
	Colloquium on the newest chemical publications, including patents.	1½
	Applied chemistry and bacteriology in industry and commerce, chemical-technical knowledge of wares; with technical excursions.	2
	Practical work in the investigation and judging (sampling) of wares.	5
	Introduction to electro-technics, Part II ... ..	1
	Experimental physics, with special reference to technical applications.	1
	Industrial hygiene, with inspection of industrial works.	1

The university was opened with a staff of eight fully qualified professors, but it was soon found necessary to increase this number. In addition to the fully qualified professors, who devote their whole time to their duties, lectures are given by professors and professional men of the town and surrounding district, including several professors from the neighbouring universities and technical

**Professorial Staff.**

universities. At the present time the professorial staff is composed of:—

Subjects.	Number of Professors, &c.
<b>A. Full chairs for—</b>	
National Economy ... ..	3
Insurance and statistics ... ..	1
Private and commercial law ... ..	1
English language and literature ... ..	1
Public law and criminal law ... ..	1
Chemistry ... ..	1
Commercial sciences ... ..	1
Commercial geography, knowledge of wares and Consular service	1
Languages of Latin origin ... ..	1
<b>B. Assistants for—</b>	
Languages of Latin origin ... ..	1
Commercial English and French ... ..	1
Technical-commercial instruction ... ..	2
<b>C. Lectures by professors from Frankfurt and surrounding universities and technical universities on—</b>	
Mining ... ..	1
Spanish ... ..	1
Chemical-technical knowledge of wares ... ..	1
Physics ... ..	1
Electro-technics ... ..	1
Law ... ..	1
Commercial politics and exchange matters, ... ..	1
Public and private philanthropy ... ..	1
History of economics and statistics ... ..	1
Social politics ... ..	1
Mechanical technology ... ..	1
Civil process and bankruptcy ... ..	1
<b>Total staff</b> ... ..	<b>27</b>

A careful study of the statistics relating to attendance, calling, age and preliminary educational qualifications of the students reveals the progress the university has made during the first two years of its existence, and the manner in which its facilities for instruction have been appreciated by the mercantile and professional classes, for whose benefit it was founded.

The attendance for the last four terms was as follows:—

—	Total Number of Students.	Fully Qualified Students for—		Not fully Qualified Students (Hörer).
		More than Eight Hours per Week (Besucher).	One Course of Lectures (Hospitanten).	
Winter, 1901-02 ...	549	36	425	88
Summer, 1902 ...	427	45	308	74
Winter, 1902-03 ...	546	95	317	134
Summer, 1903 ...	415	121	216	78

This table shows that the figures of attendance for the first year have been maintained in the second year, and that the number of fully qualified students attending more than eight hours per week has increased threefold.

The following table gives an analysis of the occupations of the students for the two years:—

Occupations.	Winter, 1901-02.	Summer, 1902.	Winter, 1902-03.	Summer, 1903.
Commercial men ... ..	295	224	220	161
Industrial and technical managers (including engineers, architects, chemists, &c.).	37	14	42	32
Lawyers and high administrative officials	52	26	45	32
Lower administrative officials ..	24	26	23	21
Masters ... ..	57	54	61	66
Students of modern languages	.	.	.	3
Other learned professions ... ..	12	9	13	7
Other professions ... ..	19	29	22	8
Women .. ...	53	45	120	85
Total ... ..	549	427	546	415

The average age of the students is comparatively high, as the following table for the year 1903 (summer term) indicates:—

Ages.	Number of Students.			
	"Besucher."	"Hospitanten."	"Hörer."	Total.
18-20 ... ..	19	35	6	60
21 ... ..	9	4	8	21
22 ... ..	14	14	10	38
23 .. ...	6	12	5	23
24 ... ..	10	6	4	20
25 ... ..	11	6	4	21
26-30 ... ..	36	55	13	104
31-40 ... ..	13	61	20	94
Above 40 ...	3	23	8	34
Total ... ..	121	216	78	415

It has already been remarked that the university is under the supervision of the Prussian Ministry of Industry and Commerce. It is managed by a "rector" chosen for a space of two years out of their midst by the professorial staff. The "rector" is supported in matters affecting the management and organisation of the university by a senate composed of the Mayor of Frankfurt, several lawyers, professors, technical and business men.

#### General Remarks.

Three examination boards exist at present, composed of the Mayor of Frankfort as president and the professors of the subjects in question. Diplomas are granted in commercial science, for masters in commercial science and for experts in insurance.

As the university is of quite recent origin, its equipment is necessarily not yet complete.

At the present time the following libraries are used by the students:—The municipal library (national economy, law, geography, colonies); Rothschild's library (modern languages); libraries of the polytechnic and technical associations; small special libraries of the various seminaries.

Amongst the collections may be mentioned:—Collection for the instruction in commercial geography and products; mechanical-technological collection, principally relating to iron; collection for the instruction in chemical technology and knowledge of wares; collection of archives relating to German and foreign insurance science.

Finally, it may be mentioned that the gradual creation of a commercial museum is in progress.

The existence of the Frankfort university has been secured by the generosity of the inhabitants of the town. The annual grants are:—

Source of Grant.	Amount.
Municipal Council ... ..	£ 1,500
Institute for Common Weal (Gemeinwohl) ...	1,500
Chamber of Commerce ... ..	250
Polytechnic Association ... ..	250
Total ... ..	3,500

No entrance fees.

Fully qualified students pay £6 5s. if they are Germans and £12 10s. if they are foreigners. The chemical laboratory costs £8, or £2 per term, according to the numbers of hours passed in practical work. Students may insure themselves against illness and accidents.

The report also gives full details of the constitution, courses, &c., of the commercial universities at Cologne, Leipsic, and Aix.



The existence of these commercial universities has been too brief to allow of a definite pronouncement as to their final success and ultimate value to the nation. But if the number of students is any indication of success, then this proof

has certainly been adduced, as the following table shows:—

Commercial University at—	Total Number of Students in the Summer Term, 1903.	Fully Qualified Students.	German Students.	Foreign Students.
Frankfort ... ..	546	95	505	41
Cologne ... ..	1,502	198	1,481	21
Leipsic ... ..	395	395	220	175
Aix ... ..	21	21	21	.
Total ..	2,464	709	1,227	237

These are the figures for the summer term of 1903, but experience shows the attendances in the summer terms are always far behind the attendances in the winter terms.

The principal object of the commercial universities is to promote the study of commercial science and research, the mutual relations between commercial science and trade and commerce. Persons engaged in trade and commerce will always, as heretofore, acquire the "technics" of their special branch by practical work, beginning in subordinate and advancing to independent positions. But it is the province of the commercial universities to impart that measure of general education which will widen their view and enable them to contemplate the multifarious branches of industry and commerce as equivalent integral parts of one harmonious economic whole.

At the present day those engaged in leading positions in industry and commerce must possess some degree of economic and social-political knowledge. Their assistance in the solution of many economic and social problems is urgently required, and if the necessity of such assistance be conceded, then it is certainly the duty of the State or municipalities, in default of private munificence, to provide adequate facilities for their instruction.

But it is not only for those engaged in industry and commerce that the commercial universities open their portals. It has already been shown that they are also attended by legal officials, lawyers and administration officials of various descriptions,

who wish to broaden their knowledge of certain branches of industrial and commercial knowledge. The thorough instruction of persons destined for commercial representation abroad in languages and economic and social science is of the greatest importance. This has already been recognised by the Berlin Foreign Office, which sent last year several candidates for the Consular service to study for some time at the Frankfort university.

The aspects of industry and commerce have both changed and increased enormously during the past fifty years. Commercial organisations have become more intricate, more numerous, more far-reaching and world-encircling, and vastly more powerful than of old. The heads of many great industrial undertakings may be likened, in a limited sense, to the absolute rulers of small States, or to combined ministers of home and foreign affairs. They negotiate with governments, parliaments and—perhaps most delicate operation of all—with the representatives of rival undertakings and interests. And unless industrial and commercial life in the future is to degenerate wholly into one fierce and relentless struggle for one-sided aggrandisement to the detriment of other members of the social body, ample opportunities for the thorough comprehension of the social and economic conditions of the present day must be provided.

It has already been shown that the four commercial universities display much diversity in their organisation, management, financial status, and other details. This is only natural in an educational venture of such magnitude, where the great benefits of experience are lacking, and all the efforts are necessarily of a tentative and experimental character.

They possess, however, in common, the distinctive academic character of the German university system. That is to say, they exact a high standard of preliminary educational qualifications and take their stand well above the level of the commercial schools, which base their instruction more upon purely commercial technics and disregard the higher economic and social aspects of modern industry and commerce.

They are further distinguished by the ample measure of academic liberty which is a common feature of all German universities, although it has been slightly encroached upon in some quarters. Plans of instruction are formulated, and the suitable direction of studies indicated, but there the power of the academic authorities ceases. Students may choose their own lectures, and are not subject

to any compulsion in attending them. The authorities are evidently of the opinion that students who desire to work will do so regardless of control, and that work performed by students under semi-compulsion possesses no great intrinsic value. A system of control is, moreover, generally unnecessary at German universities, as the great majority of students are possessed of very moderate means and attend with the firm intention of devoting themselves to hard work. Discipline also is easily maintained, as obedience to laws enacted for their benefit is a distinctive feature of German civic life.

It is by no means improbable that more commercial universities will be founded in Germany in the course of the next few years. In North Germany they are proposed for Berlin, Hamburg and Hanover; the Berlin commercial university is definitely decided upon and the buildings are being constructed. In South Germany they are proposed for Munich, Nuremberg, Stuttgart, and Karlsruhe. As far as can be seen at present the next commercial university will be founded at Munich or Nuremberg. The movement in favour of the foundation of more commercial universities may therefore be regarded as a further proof of the success of those already in existence.

It may be observed that the initiative for the foundation of the commercial universities has been taken by Chambers of Commerce and municipalities, and not by the governments of the German States. The latter, however, are now becoming aware of the importance of the movement. For the present their action is limited to the supervision exercised by the Ministers of Education and Industry and Commerce.

These remarks apply only to the commercial universities and to other commercial schools which are liberally subsidised by the governments of the various States.

The foundation of the commercial universities has brought forward many opponents, who not only deny their utility but consider them actually harmful, because the persons they instruct become too old before they engage in practical business work. They assert that boys who have passed through the nine years' school course are scarcely adapted for efficient office work, and ask what will happen when young persons who have been commercial students (*Handelsstudenten*) are required to perform elementary office and warehouse work, and carry out the manual operations often necessary in the

**Opposition to  
the Commercial  
Universities.**

same. They also object to commercial students copying the club, drinking and duelling customs which prevail at the older German and technical universities.

The extreme opponents go further and deny that a commercial university is able to train practical business men, and assert that this can only be done by close and continual contact with actual business life, and that the acquisition of too much theoretical knowledge injures the practical faculties.

These opponents also doubt if the attendance at the commercial universities will justify their maintenance, as, in their opinion, only sons of the more important merchants and manufacturers (*Grosskaufleute und Grossindustrielle*), a few officials and future masters at commercial schools will be able to avail themselves of the facilities provided. These categories of persons could, in their opinion, be provided with the instruction they require at the already existing universities, at which—should it be found necessary—a few chairs for commercial science could be created and endowed.

It is not possible, within the scope of the present report, to deal in detail with these and similar objections, many of which can be easily refuted. The cry raised against the advanced age of commercial university students was raised for many years against the technical universities, and yet these latter show a development unparalleled in the annals of recent educational history. The objection is not even founded on facts, because three out of the four existing commercial universities admit students with comparatively moderate entrance qualifications.

The objection against want of practical business knowledge on the part of commercial university students can easily be met by the enactment of a period of practical work before joining the university, and, in fact, this is already partly the case.

The assertion that commercial science can be taught at the already existing universities, and that therefore the foundation of special commercial universities is unnecessary, seems at first to carry some justification. It is contrary, however, to the prevailing tendency of modern German educationalism, which aims at providing independent highly specialised institutes for the most important branches of instruction.

The whole opposition against the commercial universities seems to be based upon a narrow-minded and vague idea of the part they are destined to play in the future. As I have already shown, their aim is not merely the training of mere business units, but lies much

higher in a social, national and economic sphere. The practical business men desired by the opponents of the commercial universities are turned out annually in thousands from the bewildering multiplicity of German secondary commercial schools. How well equipped and fitted they are for their work is amply demonstrated by Germany's commercial progress during the last thirty years, and the expansion of her exports in spite of the competition of the United Kingdom, France and the United States.

Finally, the prediction regarding the possible insufficiency of the attendances has been completely falsified by the present high number of about 2,500.

The difference of opinion in commercial circles regarding the most suitable methods of the various phases of commercial instruction is most probably the reason—or one of the reasons—why the governments of the German States have hitherto observed a certain measure of reticence and caution in their attitude towards this subject. They have acted slowly, without committing themselves to any definite opinion, but at the same time supporting more or less liberally all projects of a sound and practical nature submitted to their consideration by commercial circles and municipal authorities.

## THE APPLE.

In the growing of fruits more ground is given to the apple than to any other kind, and the apple crop may be regarded from every point of view as the most important of all fruit crops.

New apple orchards are steadily being planted throughout Ireland. In certain districts the whole aspect of the country has been changed owing to the number of apple trees planted, and the results attained from the sale of the produce of these orchards have been very satisfactory. On the other hand, the results attained from the sale of the products of old and neglected orchards, or of badly managed orchards, have been disappointing and unprofitable.

Intending planters should therefore commence in a practical and thoroughly sound way, and work on well-considered and definite lines.

Apple trees cannot adapt themselves to every soil. They may grow for a time in any soil, but they will not remain healthy, or bear profitable crops, unless the soil be suitable. It is useless to plant in light peaty soil, or in wet peaty

soil. It is also useless to plant in poor shallow soil, on gravel. The ideal soil is a good medium loam of fair depth, but by proper cultivation, and with care, good apples can be grown in stiff clayey loam, or in light sandy loam, provided there is sufficient depth.

Situation:—Fairly sheltered ground, with a slope towards S.E., S., W., or S.W., gives the best exposure.

It is not advisable to plant in a cold situation with N. or N.E. exposure, or on high ground much exposed to winds. Under no circumstances should apples be planted in low-lying, damp bottoms, or on flat ground close to a river; nor should they be planted close to high trees, as these intercept the sun and their roots impoverish the soil for a distance of 50 to 100 feet from the stems. Shelter is very important, but it must not be too dense. If necessary belts of trees should be planted for shelter, selecting hardy and moderate growing trees, such as sycamore, mountain ash, hornbeam, Scots fir, and Austrian pine.

To attain the best results, ground in which apples are to be planted should be well prepared and thoroughly worked.

**Preparation of the Soil.** Fresh manure has an injurious effect on young apple trees, therefore a crop should first be taken from the

land. Early or mid-season potatoes form an excellent preparatory

crop, as in cultivating these the ground is deeply worked and well broken up. Drainage is very important. Although the exact cause of canker in apple trees and the history of this destructive disease are still not thoroughly understood, it is well known that it is most destructive and prevalent in damp and badly-drained situations. The health of the roots has a marked influence on the resisting power of the trees, and roots cannot be healthy in badly-drained soil.

Whether the site selected be under grass, or in tillage, it should be thoroughly manured and limed, and deeply ploughed, the season previous to planting.

Opinions are divided as to the advisability of planting maiden trees, or two-year-old trees; however, if carefully handled and planted, there can be little doubt that the two-year-old trees are the best, and there is very little difference in the price. Trees should be ordered early, and planted during the month of November. They should be planted in squares 12 feet apart every way, dwarf trees and half-standard trees alternating, and trees of the same kind being opposite to each other in the lines. This system renders after-cultivation much easier, as there are straight avenues between the trees of sufficient width to admit of cultivation by horse power.

Before planting it is advisable to note on which stock the apples in the immediate vicinity seem to succeed best, Crab stocks, Free or Seedling apple stock, or Paradise stock. The half-standards should be on the Crab or Free stock, and should have clean, healthy stems, 2 ft. 6 in. to 3 ft. high. The dwarf trees should be on the broad-leaved Paradise stock. When ready to plant, open holes 12 feet apart, and commence with a dwarf tree, following with a half-standard, and so alternating dwarf and half-standard, throughout the plot, in all rows alike—dwarf opposite dwarf, half-standard opposite half-standard. Spread the roots out carefully in a circle, not all on one side, and shake the clay well through them; then, when full, firm the surface gently with the foot. Do not plant too deep. When planted the roots should be near the surface, and the soil round the tree slightly above the level of the surrounding soil. It will gradually settle down, and if not slightly raised at first the tree will eventually be in a depression, which is injurious.

Young trees to be kept as dwarfs should be stopped 18 inches above the ground. Remove with a sharp

**Pruning and  
Training.**

knife the branches near the ground, retaining four or five branches distributed round the stem. Trees for half-standards should be stopped about 3 feet above the ground; all branches should be cut cleanly away, except four or five of the best situated branches near the top. In both cases the selected branches should be shortened back to about half their length. Remove any lateral branches with a tendency to grow inwards or downwards. The object of the cultivator should be to induce the formation of a tree with branches sloping gently upwards, and with the centre kept clear and free, to admit air and light. During the summer (end of July), shorten back the laterals, remove any superfluous growths—those that are crossing or growing inwards—and if the growth is vigorous and the shoots bare, pinch the leaders. In the winter (February), repeat this process and shorten the leaders back; stop to one-third or half their length, according to the formation of fruiting spurs. The object of pruning is to secure strong branches, well placed, each with plenty of space, and covered with spurs, as the small wrinkled branches which bear the fruit are termed. If trees are not pruned the branches tend to get overcrowded; they get long and weak, and are not strong enough to support a crop of fruit. The lower part of the branches are not furnished with spurs, and the weight of fruit at the end of the branches weighs them down. The fruit also easily gets knocked off by wind.

In the case of two-year-old half-standards and dwarfs, it is hardly necessary to stake the plants, especially if care has been taken to plant them firmly.

**Staking.**

In the case of older half-standards and full-standards, they should be staked. Care must be taken not to let the stakes rub the trees. This can be prevented by giving the tying material a couple of turns between the stake and the tree. The ties must be examined during the season, and loosened where necessary. The stakes may be removed the second season after planting.

Young plantations are much injured, and free growth checked, if allowed to carry fruit too soon. Remove

**Cropping.**

any fruit which sets the first season. The second season each tree may be allowed to carry half a dozen fruits, and the third season a fair



crop can be obtained. At all ages apples should be judiciously thinned by hand picking. There is no more paying operation. A fair crop of good fruit will realise more money than a heavy crop of medium or poor fruit. The advantage to the trees is very great.

It is a distinct advantage to young orchards if the ground between the rows is cultivated. It is indiffer-

**Manuring and  
Cultivation.**

ent what crop is taken, provided it be not a rank growing crop, which would grow tall and smother the small trees. Vegetables, flowers for market, potatoes, bush fruit, such as currants, and gooseberries, raspberries, and strawberries offer a wide selection. Do not disturb the ground within three feet of the trees. Two years' meadow can be sown if done in strips between the rows, but on no account should tall rank grass be allowed to grow close to the trees. If apples are planted in meadow land a circle of at first three feet, increasing with the age of the trees to eight feet, should be reserved round each tree, and kept open and free from grass and weeds. Strong grass immediately round the trees harbours insects, excludes air from the roots, and exhausts the soil, thereby bringing the trees into bad health and condition.

As soon as fair crops are obtained additional food must be given. Where available, farmyard manure, or even stable manure, applied as a surface dressing round each tree, is very beneficial. This can be lightly forked over in the spring without breaking or disturbing the roots. Chemical manure may also be used. On certain soils basic slag has been found good, and the fruit colours well where it is used. This food must be varied. A mixture of kainit and superphosphate, one of the former to two of the latter, may be used with advantage. In years following a light crop a good dressing of fresh lime will be sufficient.

In practice it will be found apples succeed best in ground which

**Cleanliness.**

is kept clear of weeds, and free and open by cultivation and hoeing. Weeds encourage and shelter insects, exhaust the soil, and injuriously affect the trees. Absolute cleanliness is a point of first importance, and should on no account be neglected.

A certain amount of experimental cultivation of varieties may

**Varieties.**

at first be tried. The intelligent grower will note what varieties of good apples succeed best in his district, and plant accordingly, carefully omitting delicate varieties, bad growers, and

uncertain croppers. To the well-known varieties some of the more recent introductions may be added. The number finally grown should be reduced to not more than twelve to twenty varieties, including kitchen and dessert fruit. Growing a few varieties covering as long a season as possible, and growing them well, will prove the most successful plan.

The following is a list to select from :—

*Kitchen.*

Alfriston.	*Lane's Prince Albert.
Annie Elizabeth.	Lord Derby.
Beauty of Kent.	*Lord Grosvenor.
Bielo Borodawka.	Martin's Seedling.
*Bismarck.	*Newton Wonder.
*Bramley's Seedling.	Peasgood's Nonsuch.
Castle Major.	*Royal Jubilee.
*Domino.	*Sandringham.
Duchess of Oldenburg.	*Stirling Castle.
*Early Victoria.	*Stone (Loddington).
Ecklinville Seedling.	*The Queen.
Golden Spire.	Tyler's Kernel.
*Grenadier.	Tower of Glamis.
Hambling's Seedling.	*Waltham Abbey.
White Transparent.	Wellington.

*Table Apples.*

*Allington.	*Gascoyne's Scarlet Seedling.
*Beauty of Bath.	*James Grieve.
Barnack Beauty.	*Lady Sudeley.
Blenheim Orange.	Mr. Gladstone.
*Cox's Orange Pippin.	Ribston Pippin.

Those marked(\*) are most recommended.

Where large quantities of any one species of plant are cultivated closely together, the nature of the vegetation as well as the mechanical and chemical conditions of the soil become modified.

Hence such districts become favourable breeding grounds for the particular insect and fungoid enemies of the special crop grown. This is the case with the apple. Canker, spot, and mildew are the chief fungoid diseases. Aphis, American blight, Codlin moth, winter moth, and apple-blossom weevil are the chief insect pests.

Spraying is the chief remedy for all these evils; a most effective remedy when well done. Early in February all trees and bushes, if bush fruit be grown, should be sprayed with the caustic spray—1 lb. crude potash, 1 lb. caustic soda,  $\frac{1}{2}$  lb. soft soap, to 10 gallons water. Where possible the mixture should be used when warm. This spray kills moss and lichen on the stems, as well as any insects it touches. It is also a fungicide.

Before the leaves open, they should be sprayed with Bordeaux Mixture.

When the leaves and fruits are fairly developed, they should be sprayed again with Bordeaux Mixture, to which a little Paris Green has been added, about 4 ozs. to every 50 gallons. The Paris Green should be made into a paste before adding it to the water. The Bordeaux Mixture used at the *third* spraying when the leaves are expanded, should be diluted by adding water when prepared.

If American blight or woolly aphis does not succumb to the caustic, or other sprays, it can be eradicated by smearing with petroleum, using an ordinary soft sash tool, or painter's brush, and painting over each patch with petroleum. If trees are badly infested, it is almost impossible to get them clean, as the insect gets to the roots and breeds there. It is better to burn such trees. If ordinary green fly or aphis appears on the young growths during the summer, it can easily be banished by spraying with a solution prepared by adding 10 gallons boiling water to 2 lbs. quassia chips, and 1 lb. soft soap, let stand for 24 hours. Warm again before using.

It must be remembered that trees in good health are much less liable to disease and to attacks from insects than trees which are in poor condition.

Trees can only be kept in good health by constant and reasonable attention—attention to cleanliness, attention to the soil, attention to the roots.

Over-stimulating is quite as injurious as starvation.

*Copies of this article in leaflet form (No. 55) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.*

OFFICIAL DOCUMENTS.

## LIVE STOCK SCHEMES, 1905

### PREFATORY NOTE.

The schemes for improvement of live stock for 1905 have been prepared by the Department, with the assistance of their Special Advisory Committees. Some modifications have been made in the schemes at the suggestion of several County Committees of Agriculture and Technical Instruction. The principal modifications are the following:—

In the cattle scheme, four-year-old bulls, calved between the 1st September, 1900, and the 31st August, 1901, are now eligible to compete for premiums. The value of a premium is fixed at £15 for all bulls, whether one, two, three or four-year-old. In the awarding of premiums in 1905, preference will be given, subject to certain conditions, as in last year, to animals which were awarded premiums in 1904. Premiums remaining unallocated in each county may then be competed for by bulls from one to four years old, inclusive, at the principal spring shows.

The attention of County Committees is called to Clause 29, and it is hoped that every effort will be made to secure compliance therewith.

The swine scheme has been re-modelled at the desire of many County Committees. Boars which were awarded £5 premiums in 1904 may compete for a further premium of £3 in 1905.

In view of the difficulty which has been experienced by individual applicants in endeavouring to procure boars, a clause has been inserted in the scheme for 1905, under which the Department will, as far as practicable, assist intending purchasers to secure suitable animals.

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## SCHEME FOR ENCOURAGING IMPROVEMENT IN THE BREEDS OF HORSES.

1905.

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### GENERAL REGULATIONS.

1. The main objects of this scheme are to encourage the improvement of horse breeding in Ireland by inducing stallion owners to keep suitable and sound sires of a high degree of excellence, and by inducing farmers to retain their best young mares for breeding purposes. When arranging the details of this scheme to suit local requirements each County Committee of Agriculture and Technical Instruction, hereinafter referred to as the County Committee, is requested to secure to small farmers as large a share of the resulting benefits as is practicable.

2. The sum to be provided by the Department under this scheme for encouraging improvement in the breeds of horses in a county will depend on—(1) the amount provided in aid of the scheme by local authorities, (2) the special needs of the locality, and (3) the proportion which the amount of the local contribution bears to the genuine capacity of the locality to contribute.

In accordance with Section 16 (6) of the Agriculture and Technical Instruction (Ireland) Act, 1899, the Department will not, in the absence of special considerations, apply or approve of the application of money under this scheme in a locality out of which aid is not given either by local authorities or from other local sources.

3. The joint fund available under this and other live stock schemes, comprising the grant from the Department and the money provided locally, will, subject to the approval of the Department, be administered in a county in accordance with the provisions of Clauses 6 and 7.

4. The Secretary of the County Committee, hereinafter referred to as the Secretary, whose appointment for the year and whose duties must first be approved by the Department, shall act as Secretary to the sub-committee for live stock.

5. It will be the duty of the Secretary to submit, for the approval of the Department, all details of schemes proposed for his county.

No action shall be taken by any local authority towards putting this scheme into operation until the sanction of the Department has been obtained in writing.

6. The County Council should by resolution delegate to the County Committee full powers for the purposes of the Agriculture and Technical Instruction (Ireland) Act, 1899, and that Committee should appoint from among their own members an executive sub-committee for live stock.

No payments, however, in connection with this scheme shall be authorised except by the County Committee.

7. The duties of the sub-committee for live stock will be to frame the details of the live stock schemes for the county in accordance with the conditions of the Department's general scheme, and to act as the executive committee for the administration of such county schemes when they have been approved by the County Committee and by the Department, but the executive sub-committee shall not have the power of altering or amending such approved schemes or of authorising any payment in connection with these schemes.

8. The joint fund available under this scheme shall, after the expenses of administration are provided for, be applied solely for nominations of mares.

9. In the event of there not being a sufficient number of registered stallions in any county for the purposes of this scheme, the Department may provide for such county, under certain conditions to be prescribed by the Department, in either of the following ways, viz. :—

- (1.) By assisting approved applicants, whether individuals or associations, to buy suitable stallions under the Department's scheme of loans for the purchase of stallions.

- (2.) By giving premiums, upon terms to be prescribed, for approved stallions in the hands of private owners, who are prepared to send such stallions to districts to be approved by the Department.

### REGISTRATION OF STALLIONS.

10. Thoroughbred stallions may be registered for any county in Ireland.

All Clydesdale and Shire stallions registered in 1904 may again be offered for registration under this scheme for the particular districts in which they were registered during that year, but no other stallions of these breeds will be accepted for registration in 1905 except for the Province of Ulster, the counties of Dublin and Louth, and the district comprised within a radius of ten miles of the city of Cork.

11. The Department will publish a Register of Stallions for service under this scheme, and owners of suitable stallions are invited to apply to have their horses placed on this register, subject to the provisions of this scheme. The Department make it a condition that a stallion, to be entitled to a subsidy in the form of nominations, or a premium, shall be registered or accepted for registration in the Department's Register of Stallions for the year 1905.

Copies of the register, when published, may be had free of charge on application to the Department.

12. (1.) Owners offering their stallions for registration under this scheme must, if required, submit them to inspection and veterinary examination by the Department. Notice of the arrangements as to place and method of inspection will be given.

(2.) Thoroughbred stallions, to qualify for registration, must be entered in Weatherby's Stud Book, or, if Clydesdale or Shire, be entered in the stud book of the respective breed. If required the stallion owner or (if the stallion is being purchased with a view to registration in Ireland) the vendor must produce a certificate from the keeper of the stud book to the effect that the stallion offered for registration is entered in the stud book or will duly appear in the next volume.

(3.) No application will be considered in which every particular required in the form of application is not supplied.

(4.) No application for the registration of a two-year-old stallion will be considered.

(5.) No application for the registration of a stallion will be considered unless the owner agrees to accept for service by that stallion not less than twenty, and not more than fifty, nominated mares, which are entitled to his services. This regulation is subject, however, to the conditions stated in Clauses 22 (9 and 10) and 30.

(6.) Stallions accepted for registration will be registered for particular districts only, and shall not, without the written consent of the Department, be removed to other districts. If a stallion is removed without such consent to a district for which he was not registered, the registration of such stallion shall be cancelled.

13. Forms of application for the registration of stallions may be had from the Department.

One of these forms, accurately filled up in every particular and signed by the owner or his agent, must be lodged in or sent by post so as to reach the offices of the Department not later than the 30th day of September, 1904.

Applications received subsequent to that date, and before the 1st day of November, 1904, must be accompanied by a fee of £1. Thereafter a fee of £5 must accompany each application.

14. (1.) Applications for the registration of stallions imported into Ireland after the 30th day of September, 1904, or for stallions in Ireland which have not previously been used for stud purposes, will be considered without fee if received on any date up to the 31st of March, 1905. Their entry in the published Register for 1905 cannot, however, be guaranteed, but the owners of such stallions will be accorded all the privileges enjoyed by the owners of stallions appearing in the printed Register.

(2.) Persons in Ireland intending to import stallions or to buy stallions already located in Ireland are advised not to complete the purchase until the stallions have been accepted for registration. [See Clause 18.]

(3.) The Department will, as far as practicable, supply the services of their Inspectors free of charge to persons in Ireland intending to purchase and import suitable stallions for districts in which there is not a sufficient number of registered stallions for the purposes of this scheme; but at least ten days' notice must be given, and the stallion must have been seen and provisionally approved by the intending purchaser.

(4.) The vendor must, if required, submit a certificate from the Secretary of the stud book to the effect that the animal is entered in the stud book, or will duly appear in the next volume.

15. Stallions offered for registration may be inspected for their general merit and fitness for the purposes of the scheme. Such inspection shall be carried out by one or more Inspectors appointed by the Department. If the stallion has been to stud, evidence of his fruitfulness, and, where practicable, of the character of his stock, must be produced, if required. Inspection for general fitness, when deemed necessary, shall, as far as possible, precede veterinary examination.

16. (1.) The veterinary examination shall be carried out by one or more qualified veterinary surgeons, appointed by the Department.

(2.) No stallion shall be rejected as unsound unless suffering from one of the following diseases:—Cataract, Roaring, Whistling, Ring-bone, Sidebone, Unsound Feet, Spavin, Curb.

17. The inspection for general merit and fitness and the veterinary examination of stallions offered for registration may be dispensed with in cases where evidence of suitability and soundness have been sufficiently established to satisfy the Department.

18. The Department cannot undertake to disclose their reasons for the non-acceptance for registration of any animal, but with the exceptions hereinafter mentioned the owner of any stallion in Ireland not accepted for registration may have his case reconsidered by one or more referees appointed by the Department. Every notice of appeal must be accompanied by a fee of £5, which will



be returned in the event of the appeal being upheld. Notice of appeal must be given in writing within ten days from the date of the letter of rejection.

This privilege shall not extend to cases in which stallions have been rejected on appeal in a previous year or to cases in which stallions are offered for registration under Clause 14 (1 and 2).

19. The Department reserve to themselves the right, without assigning any reason, or without inspection or veterinary examination, to decline to register any stallion for the purpose of this scheme.

No right of appeal shall lie in the case of stallions rejected under this clause.

20. Owners of stallions making, or promising to make, any gift to the owner of a nominated mare of a portion of the service fee, allowing a nominated mare to be served by a stallion other than that originally selected by the owner of the mare, or detected in any other fraudulent practices in connection with this scheme shall have their horses struck off the Register of the Department, and shall be debarred from obtaining any future benefit under the Department's schemes. They shall also forfeit any claim in respect of monies due to them under this scheme.

### NOMINATIONS OF MARES.

21. (1.) Upon consecutive dates, and at places to be first approved by the Department, and duly advertised by the County Committee for at least three weeks before the date of the exhibitions by posters or in the local newspapers, one or more exhibitions of farmers' mares shall be held in each county for the purpose of issuing nominations.

(2.) Wherever practicable, and in order to avoid unnecessary expense, two exhibitions should be held on one day at two centres, *i.e.*, one in the morning and one in the afternoon.

(3.) The Secretary must send to the Department two copies of each poster and each advertisement immediately after they are issued.

(4.) The Secretary shall receive entries for each exhibition on forms to be obtained from him. Each form must be signed by the owner of the mare, who, if required, must sign a statutory declaration to the effect that all the particulars given in the entry form are correct.

22. (1.) Mares to receive nominations must be the *bona-fide* property of a farmer resident in the county (with the exception of the case provided for in No. 4 of this clause).

(2.) In order to secure the second of the main objects stated in Clause 1 of this scheme, preference will be given to the best young mares under six years of age.

(3.) Each mare must be the *bona-fide* property of a farmer, the tenement valuation in aggregate of whose holding or holdings, wherever situated, and for which he is rated, does not exceed the limit fixed by the County Committee.

Subject to such conditions as may be prescribed by the Department herds' mares will be eligible to compete for nominations.

(4.) A farmer whose holding extends into more than one county may apply for a nomination in any one of the counties in which he holds land, provided the aggregate tenement valuation of the holdings, wherever situated, and for which he is rated, does not exceed the limit fixed under (3) for the county in which he proposes to compete.

(5.) Subject to the provisions of Clause 10 and to the approval of the Department, nominations may be restricted to any one or two of the breeds of registered stallions.

(6.) The mares to receive nominations shall be selected by a judge or judges appointed by the Department, and they must be passed free from any hereditary disease by a veterinary surgeon appointed for that purpose by the Department.

(7.) No farmer shall receive more than one nomination, unless the number of mares selected and reserved be insufficient for the granting of the full number of nominations allotted to the county, in which case a second nomination may be awarded.

(8.) At each local exhibition all eligible mares not selected for nominations shall be placed on a reserved list in strict order of merit.

(9.) Owners of registered stallions have a right to require hobbles to be used.

(10.) Owners of registered stallions may refuse service to mares suffering from a contagious disease; but the reasons for such refusal must be intimated immediately to the Department and to the County Committee by the stallion owner. Mares can be served only at their owners' risk.

(11.) The County Committee may, with the approval of the Department, refuse a nomination for any mare, without assigning any reason therefor.

(12.) A farmer who, without sufficient cause, fails to send his nominated mare to the selected registered stallion shall be ineligible to enter mares for nominations in subsequent years.

23. The term "farmer" is to be understood to mean a person who derives his means of living mainly from farming.

24. (1.) The lists of owners of mares selected for nomination and of mares reserved must be submitted to the Department by the Secretary, within six days after the date of the last exhibition in the county, on the form supplied for the purpose.

(2.) The dockets for the selection of stallions and the service tickets will be supplied to the Secretary, when such form, complete, has been received by the Department. The selection dockets and service tickets shall then be filled in by the Secretary, who shall return them to the Department for the necessary check and authorisation for issue.

(3.) The Secretary, before issuing the selection docket, shall date it.

(4.) The service ticket must not be issued by the Secretary until the owner of the mare has returned to him the selection docket with the name of the selected registered stallion duly entered thereon by the said owner.

(5.) Not later than sixteen days from the date of issuing of the service tickets, the Secretary shall forward to the Department, on the form provided for the purpose, particulars regarding the distribution of such tickets.

25. (1.) A farmer receiving a nomination must select one of the registered stallions in Ireland of the breed approved for the county by the County Committee, provided the service list of the stallion selected is not already full. See Clause 26 (2).

(2.) Such farmer must make his selection and send the name of the stallion on the selection docket to the Secretary within fourteen days after having received such docket.

26. In any one of the following cases the nomination shall be forfeited and shall lapse:—

- (1.) If the farmer to whom a nomination is issued should fail to select a stallion within the fourteen day limit.
- (2.) If the owner of the mare is also the owner of the registered stallion selected.
- (3.) If the farmer to whom a nomination is issued should permit his nominated mare to be served by a stallion other than that originally selected.
- (4.) If the nominated mare should die before first service.
- (5.) If the nominated mare should be sold before the date of the first service.

The Secretary shall cancel and return to the Department the numbered tickets for all such lapsed nominations, and may issue to the owners of mares strictly in the order in which they appear on the reserve list new tickets to be obtained from the Department in lieu of such cancelled tickets.

27. A nomination is not transferable, and is available only for the selected mare.

28. The service season shall be reckoned to begin on the 1st day of March, 1905, and to terminate on the 31st day of July, 1905.

29. The value of the nomination fee shall be uniform for the county, but may vary with the breed of stallions selected, and shall not be less than £2, or more than £3.

30. (1.) When the service fee exceeds the value of the nomination, the excess shall be paid by the owner of the mare to the owner of the stallion at the time of the first service, or at such other time as may be agreed upon between them.

(2.) In addition, the farmer shall pay a groom's fee of 2s. 6d. for each nominated mare.

31. (1.) Not earlier than the 1st August, 1905, and not later than the 1st October, 1905, the owners of registered stallions shall forward to the Secretary the selection dockets and the service tickets for the services effected by their sires, accompanied by a statutory declaration to the effect that the conditions of service have been duly complied with.

(2.) The form of declaration required under this clause may be had on application to the Secretary.

(3.) The Secretary shall examine and check all these documents, and when correct shall forward them to the Department.

(4.) Payment of nomination fees to owners of stallions shall not be made until the Department have been satisfied as to the fulfilment of the conditions of this scheme, and have signified in writing their approval of each particular payment.

32. No payment shall be made in any of the following cases:—

(1.) Where any erasure or alteration appears on either the selection docket or the service ticket.

(2.) Where both the selection docket and the service ticket bearing corresponding numbers are not produced.

(3.) Where a nomination issued in respect of a particular nominated mare is used for another mare, whether nominated or not.

(4.) Where service has been effected by a stallion other than that originally selected.

(5.) Where an owner who received a nomination failed to send his mare for service.

(6.) Where the owner of a registered stallion fails to lodge by 1st October, 1905, with the Secretary, in the manner provided in Clause 31, his claim for payment of nomination fees.

33. Owners of mares accepting, or agreeing to accept, from a stallion owner, portion of the service fee, changing nominations, substituting mares, or detected in any other fraudulent practices in connection with these regulations shall be debarred from obtaining any future benefits under the Department's scheme.

34. In all cases of dispute in matters connected with this scheme the decision of the Department shall be final.

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## SCHEME FOR ENCOURAGING IMPROVEMENT IN THE BREEDS OF CATTLE, 1905.

1. The main objects of this scheme are to improve the dairy and store cattle in Ireland by encouraging the breeding or introduction of pure bred bulls of a high degree of excellence, and by inducing associations of farmers or persons of means to purchase high-class bulls for the use of small farmers.

2. The sum to be provided by the Department under this scheme for encouraging improvement in the breeds of cattle in a county will depend on—(1) the amount of money provided in aid of the scheme by local authorities, (2) the special needs of the locality, and (3) the proportion which the amount of the local contribution bears to the genuine capacity of the locality to contribute.

In accordance with Section 16 (6) of the Agriculture and Technical Instruction (Ireland) Act, 1899, the Department will not, in the absence of special considerations, apply, or approve of the

application of money under this scheme in a locality out of which aid is not given either by local authorities or from other local sources.

3. The joint fund available under this and other live stock schemes, comprising the grant from the Department and the money provided locally, will, subject to the approval of the Department, be administered in a county by the County Committee of Agriculture and Technical Instruction, hereinafter referred to as the County Committee, in accordance with the provisions of Clauses 6 and 7.

4. The Secretary of the County Committee, hereinafter referred to as the Secretary, whose appointment for the year and whose duties must first be approved by the Department, shall act as Secretary to the sub-committee for live stock.

5. It will be the duty of the Secretary to submit, for the approval of the Department, details of all schemes proposed for his county.

No action shall be taken by any local authority towards putting this scheme into operation until the sanction of the Department has been obtained in writing.

6. The County Council should by resolution delegate to the County Committee full powers for the purposes of the Agriculture and Technical Instruction (Ireland) Act, 1899, and that committee should appoint from among their own members an executive sub-committee for live stock.

No payments, however, in connection with this scheme shall be authorised except by the County Committee.

7. The duties of the sub-committee for live stock will be to frame the details of the live stock schemes for the county in accordance with the conditions of the Department's general scheme, and to act as the executive committee for the administration of such county schemes when they have been approved by the County Committee and by the Department; but the executive sub-committee shall not have the power of altering or amending such approved schemes or of authorising any payment in connection with these schemes.

8. The joint fund available under this scheme shall, after the expenses of administration are provided for, be applied solely in providing premiums for bulls.

9. In exceptional circumstances the Department may, under certain conditions to be prescribed by them, provide for a county either by purchasing bulls on behalf of applicants selected by County Committees under Clause 17, or by granting loans to persons of very small means who desire to purchase bulls through the Department.

Applications under this clause must be made—by the selected individuals—directly to the Department not later than 1st March, 1905.

10. Subject to the approval of the Department, premiums may be restricted to any one or more breeds of pure bred bulls, except Galloway, Ayrshire, Kerry, and Dexter, for which special provision may be made after consultation with the committees of the counties concerned in the breeding of this class of stock.

11. Only bulls entered, or eligible for entry, in the herd books of their respective breeds shall be selected for premiums. The owner of a bull not entered must, if required, produce a certificate from the secretary of the herd book to the effect that the bull is eligible for entry, and will duly appear in the next volume.

12. Bulls of the following ages are eligible for premiums:—

- (1.) Yearlings, calved between 1st September, 1903, and 1st May, 1904;
- (2.) Two-year-olds, calved between 1st September, 1902, and 31st August, 1903.
- (3.) Three-year-olds, calved between 1st September, 1901, and 31st August, 1902.
- (4.) Four-year-olds, calved between 1st September, 1900, and 31st August, 1901.

All bulls must show a high degree of excellence. Two-year-olds, three-year-olds, and four-year-olds which show signs of having been badly cared, or which are not fully developed, will not be eligible.

13. The amount of a premium for a high-class bull shall be £15, payable, subject to the regulations of this scheme, at the close of the season.

14. The owners of all two-year-old, three-year-old, and four-year-old bulls applying for premiums under this scheme must, if required, produce evidence of the fruitfulness of the bulls in the preceding year.

15. (1.) Bulls which were awarded premiums in 1904 will be inspected by the Department prior to the spring shows and sales, at local centres only, on dates of which the owners will be duly advised by the Department.

In no case will animals be inspected at the owner's residence.

(2.) Owners of such bulls failing to present their animals for inspection on the dates selected will not have their cases reconsidered.

(3.) Bulls which have been exhibited at local centres and provisionally selected for a premium must stand for service at the same place as in 1904, and unless in exceptional circumstances approved by the Department, owners of selected bulls will not be allowed to change the premium to a yearling bull.

(4.) The Department will furnish the County Committee with a list of bulls which have been passed at such local centres for premiums in 1905.

(5.) The County Committee should then proceed to select applicants for premiums for bulls to be selected at any of the principal shows or sales of bulls.

16. Bulls, of the ages specified in Clause 12, other than those referred to in Clause 15, shall be selected at the principal spring shows and sales. The provisional selection of bulls for premiums at these shows and sales shall be made by the Department alone.

Intending purchasers must make their own selection from the list of animals passed by the Department.

17. (1.) The County Committee shall, by means of advertisements in the local papers or by posters, invite applications from

persons who, if selected, are prepared to keep in districts not provided for in Clause 15 premium bulls, to be chosen at one or other of the principal shows or sales. Such applications must be made on forms to be obtained from the Secretary.

(2.) A list of such applicants, when selected by the County Committee, should be forwarded to the Department by the Secretary, on the form provided for that purpose, not later than five days before the show or sale at which the bulls are to be selected.

(3.) The Department's Inspector or Inspectors will attend at the principal shows and sales. They shall not be empowered to recognise applications from any persons appearing at the shows or sales whose names are not on the list supplied by the Secretary as having been duly selected to keep a premium bull.

(4.) To prevent disappointment, all intending purchasers or competitors at such shows or sales should make early application to the Secretary.

(5.) Applicants selected by a County Committee who exhibit or purchase at one of the principal shows or sales provisionally selected bulls of the breeds approved by the County Committee need not again show these bulls in 1905 for a premium. The granting of a premium to a bull shall not in any way be regarded as affording a right to a premium in a subsequent year.

(6.) As soon as a selected applicant has procured a bull which has been provisionally passed for a premium he should notify the Secretary on a form to be obtained from the latter for the purpose. The Secretary shall thereupon advise the Department on the prescribed form of the particulars as to location, &c., of each bull.

18. There will be no exhibitions of bulls in 1905, such as were held under the 1902 and 1903 schemes.

19. The service season for a premium bull shall not commence until the owner of the bull has been informed by the Secretary that the Department have approved of the selection of the bull for a premium. It will be the duty of the Secretary to obtain the sanction, in writing, of the Department with the least possible delay.

The service season for premium bulls shall close on 31st December, 1905.

20. The Secretary shall supply the owner of each premium bull under this scheme with posters, which such owner must undertake to distribute in the district in which the bull is to serve.

21. Each premium yearling bull shall serve not less than thirty cows, and all other premium bulls not less than forty cows each, other than those that are the property of the owner of the bull. The service fee for the number of cows stated shall in all cases be 1s. each, inclusive of all charges. After the minimum number of cows have been served the owner may fix such fee as he may desire.

22. The County Committee may make such regulations as they think necessary with regard (1) to the number of premium bulls which any one person may keep, provided that no person shall possess two premium bulls of the same breed unless located at least three miles from each other, (2) to the place in which a premium bull shall remain during the season for service, (3) to the penalties to be imposed upon the owner of a premium bull who fails to take proper care of the animal, (4) to the number of cows which any one farmer may send to a premium bull, and (5) to the exclusion of pedigree cows from this scheme.

23. Each cow shall be the property of a farmer resident in the county, the aggregate tenement valuation of whose holding or holdings wherever situated and for which he is rated, does not exceed the limit fixed by the County Committee.

Herds, artisans and bona fide agricultural labourers may obtain service for their cows on the same terms as a farmer.

24. The term "farmer" is to be understood to mean a person who derives his means of living mainly from farming.

25. The owner of a premium bull shall not, before the stipulated number of cows have been served, reserve the use of the bull for the cows of any individual or of the members of any society. He must, subject to the provision of Clause 31, allow the bull to serve cows in the order in which they are presented.

26. The Department reserve the right to brand or mark premium bulls, and to inspect them from time to time.

27. The Department also reserve the right to apply the tuberculin test, at their own expense, to any premium bull.

28. (1.) Not earlier than 1st September, 1905, and not later than 15th January, 1906, the owner of a premium bull shall forward to the Secretary a form containing a return of the names, addresses, and valuations of the persons whose cows have been served by the bull, at the fee named in Clause 21, together with dates of such services, as well as a statutory declaration, signed before a magistrate other than the owner of the bull, certifying that the said cows have been duly served, and that all the regulations of this scheme have been strictly complied with. (2) The Secretary shall examine and check all such forms, and when correct shall forward them to the Department. (3) As soon thereafter as the Department are satisfied as to the fulfilment of the conditions of this scheme the Secretary will be notified that payment of the premiums or part of the premiums payable under this scheme may be made to the owners of the bulls. (4) Any premium not applied for on or before 15th January, 1906, shall be considered as having lapsed.

Forms for the declaration required by this Clause may be had on application to the Secretary.

29. All owners of premium bulls must satisfy the County Committee that they have provided themselves with a syringe and disinfecting materials for the washing of their animals after each service, in accordance with the instructions given in the Department's leaflet No. 13, on Contagious Abortion in Cattle.

30. In the event of the bull being unable from any cause to complete the prescribed number of services, the Department reserve the right to withhold the premium, or any part of it, or in any other way to deal specially with the case, according as the circumstances may require.

31. The owner of a premium bull has the right to refuse the use of his bull in any case where he is satisfied that the service would be prejudicial to the animal. The reasons for such a refusal must, however, be communicated to the County Committee immediately on the refusal of the application.

32. In all cases of dispute in matters connected with this scheme the decision of the Department shall be final.



## SCHEME FOR ENCOURAGING IMPROVEMENT IN THE BREEDS OF SWINE, 1905.

Clauses 1 to 7, inclusive, of the Department's Horse and Cattle Schemes, 1905, shall, with the necessary modifications, apply to this scheme.

### SWINE.

8. The system to be adopted in connection with this scheme for encouraging improvement in the breeds of swine shall be the provision of premiums for selected pure-bred boars.

9. Subject to the approval of the Department, premiums may be restricted to any one or more pure breeds of swine.

10. Only boars eligible for entry in the Register of Pigs of the Royal Dublin Society shall be selected for premiums. The owner of a boar selected for a premium must have the animal entered in said Register.

11. Boars belonging to any Society or to any Association of Farmers shall be eligible, if pure-bred, to compete for premiums; but the premiums shall be paid to the Society or Association, and not to the individuals in whose charge the boars are placed.

12. Boars when selected for the first year's premium should be not less than six months or more than twelve months old. The grant of a premium to any boar shall not be regarded as affording any right to a premium in a subsequent year.

13. The value of a premium shall be £5 for the first year, and £3 for the second year.

14. Only those boars which were awarded premiums in 1904 shall be eligible for the second year's premium in 1905. All such boars must show a high degree of excellence. Two-year-old boars which show signs of having been badly cared for or are not fully developed will not be eligible.

The owner of a boar selected for a second premium must produce evidence of the fruitfulness of the boar in the preceding year.

15. A boar which may be awarded a premium this year out of funds administered by any other body shall not be eligible for a premium under this scheme.

16. (1.) Boars which were awarded premiums in 1904 will be inspected by the Department at local centres on dates of which the owners will be duly advised by the Department.

(2.) Owners of such boars failing to produce their animals for inspection on the date selected will not have their cases reconsidered.

(3.) Boars which have been exhibited at local centres and provisionally selected for a premium must stand for service at the same place as in 1904, and unless in exceptional circumstances approved by the Department, owners of selected boars will not be allowed to change the premium to a yearling boar.

(4.) The Department will furnish the County Committee with a list of boars which have been passed at such local centres for premiums in 1905.

(5.) The County Committee should then proceed to select applicants for premiums for young boars.

17. (1.) The County Committee shall by means of advertisements in the local papers, or by posters, invite applications from persons who, if selected, are prepared to keep premium boars in districts not already provided for under Clause 16 of this scheme. Such applications must be made on forms to be obtained from the Secretary.

(2.) As soon as a selected applicant has procured a boar which has been provisionally passed for a premium he should notify the Secretary on a form to be obtained from the latter. The Secretary shall thereupon advise the Department on the prescribed form of the particulars as to the location, &c., of each premium boar.

18. The provisional selection of boars for premiums shall be made by the Department alone at the principal spring shows and at local centres to be fixed by the Department, but no inspection for the purpose of this scheme shall be made after the 1st July, 1905, save in exceptional circumstances.

19. The Department, through the County Committee, will as far as practicable assist intending purchasers to secure suitable boars for the purposes of this scheme.

20. The service season for a premium boar shall not commence until the owner of the boar has been informed by the Secretary that the Department had approved of the selection of the boar for a premium. It will be the duty of the Secretary to obtain the sanction (in writing) of the Department with the least possible delay. The service season for premium boars shall close finally on the 31st December, 1905.

21. The Secretary shall supply the owner of each premium boar under this scheme with posters, which the said owner must undertake to distribute in the district in which the boar is to serve.

22. Each yearling premium boar must serve not less than 30 sows, and each two-year-old boar not less than 40 sows. The service fee, inclusive of all charges for this number of sows, shall not exceed 1s. for each sow. After the minimum number of sows have been served, the owner of the boar may fix such fee as he may desire.

23. The County Committee may make such regulations as they think necessary with regard (1) to the number of premium boars, which any one applicant may possess (provided no person shall possess two premium boars of the same breed unless located at least three miles from each other), (2) to the place in which a premium boar shall remain during the season for service, (3) to the penalties to be imposed upon the owner of a premium boar who fails to take proper care of the animal, and (4) to the number of sows which any one farmer may send to a premium boar under this scheme.

24. Each sow shall be the property of a farmer resident in the county, the aggregate tenement valuation of whose holding, or holdings, wherever situated, and for which he is rated, does not exceed the limit fixed by the County Committee.

Herds, artisans, and *bona fide* agricultural labourers may obtain service for their sows on the same terms as a farmer.

25. The term "farmer" is to be understood to mean a person who derives his means of living mainly from farming.

26. The owner or owners of a premium boar shall not, before the stipulated number of sows have been served, reserve the use of the boar for the sows of any individual, or of the members of any society. Subject to the provisions of Clause 30, sows must be served by a premium boar in the order in which they are presented.

27. The Department reserve the right to brand or mark premium boars, and to inspect them from time to time.

28. (1.) Not earlier than 1st September, 1905, and not later than 15th January, 1906, the owner of each premium boar shall forward to the Secretary a form containing a return of the names, addresses, and valuations of the persons whose sows have been served by the premium boar—together with dates of such services—at the fee named in Clause 22, as well as a statutory declaration, signed before a magistrate, other than the owner of the boar, certifying that the said sows have been served, and that all the regulations of this scheme have been complied with. (2.) The Secretary shall examine and check all such forms, and when correct shall forward them to the Department. (3.) As soon thereafter as the Department are satisfied as to the fulfilment of the conditions of this scheme, the Secretary will be notified that payment may be made to the owner or owners of the boar of the premium, or part of the premium, payable under this scheme. (4.) Any premium not applied for on or before the 15th January, 1906, shall be considered as having lapsed.

Forms for the declaration required by this clause may be had on application to the Secretary.

29. In the event of a boar being unable, from any cause, to complete the prescribed number of services, the Department reserve the right to withhold the premium, or any part of it, or in any other way to deal specially with the case, according as the circumstances may require.

30. The owner of a premium boar has the right to refuse the use of his boar in any case where he is satisfied that the service would be prejudicial to the animal. The reason for such refusal must, however, be communicated to the County Committee, immediately on the refusal of the application.

31. In all cases of dispute in matters connected with this scheme the decision of the Department shall be final.

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## LOANS FOR THE PURCHASE OF STALLIONS.

### YEAR 1905.

1. No application for a loan for the purchase of a stallion will be considered if coming from a locality in which, in the opinion of the Department, there is already a sufficient number of registered stallions for the purpose of their scheme.

2. The individual or association applying for a loan must be approved of by the Department.

3. No loans will be made save for the purchase of stallions passed by the Department as eligible for registration in 1905.

4. The purchase price of the stallion must be approved of by the Department.

5. Before the loan is granted the stallion must be insured in the name of the Department by the purchaser in an approved Live Stock Insurance Office for the full amount of his purchase price, and the payment to the Department of the annual premiums on this insurance must be secured under conditions similar to those provided for the repayment of principal and interest. (*See 7 and 8.*) The receipt and renewal receipts for the annual premiums payable in respect of such policy must immediately on the same being obtained, be deposited with the Department.

6. Approved applicants for a loan must lodge with the Department the policy of insurance, together with one-third of the purchase price of the stallion.

7. As soon thereafter as possible the individual or association to whom the loan is granted, shall enter into a bond to repay the Department the amount which will be advanced by them—viz., two-thirds of the purchase money—in five equal annual instalments, at the end of one, two, three, four, and five years, respectively, from the date of payment of the full purchase price to the vendor by the Department, together with interest at the rate of  $2\frac{1}{2}$  per cent. on the outstanding balance.

8. In the case of an individual two or more solvent sureties, approved by the Department, in addition to the purchaser, must guarantee repayment. In the case of an association repayment must be guaranteed by the Committee of the association, or in such other manner as the Department may require.

9. On receipt by the Department of (1) the policy of insurance, (2) one-third of the agreed on purchase money, (3) the bond duly completed, and (4) the necessary stamp duty, the Department will pay to the vendor the full amount of the agreed on purchase price, and intimate to him that possession of the stallion may be given up to the borrower.

10. If the vendor, before being paid by the Department, gives up possession of the stallion, the Department will hold themselves free of any liability to the vendor.

11. The individual or association must offer the stallion each year for registration, must undertake to conform at all times to the regulations of the Department's schemes for encouraging improvement in the breeds of horses, and during the continuance of the loan must allow the stallion to serve nominated mares at a fee to be fixed by the Department.

Such fee, however, in no case to exceed £3 per mare.

12. Nominated mares, the property of the members of an association purchasing a stallion under this scheme, shall not take priority of service over nominated mares owned by non-members.

As soon, however, as the number of nominated mares required by the scheme may have been served, the service of the stallion may be retained exclusively for the use of the members of such association.

13. The individual or association in whose favour the loan is being granted must, at his or their own expense, provide suitable accommodation for the stallion, procure all necessary veterinary attendance, and care the animal in a proper manner, to the satisfaction of the Department.

14. The Department shall have the right to inspect the stallion at any time, and to remove him at any time, if it is found, in the opinion of the Department, that he is not being properly cared, or if an instalment of the principal and interest is in arrear for more than four weeks.

15. The stallion shall remain the property of the Department until all instalments or arrears of principal and interest are paid off, and shall not be disposed of, without the consent of the Department, for five years.

16. Should the stallion be awarded a premium, such premium shall not be paid to the individual or association in possession of the stallion, but shall be credited, after the close of the season, towards the repayment of the loan.

17. The Department reserve the right to refuse any application for a loan without assigning any reason for such refusal.

18. The decision of the Department in all matters relating to these loans shall be final.

Forms of application can be had from the Department.

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## LOANS FOR THE PURCHASE OF BULLS.

### YEAR 1905.

1. Applications for loans for the purchase of bulls must be made by each applicant—on the prescribed form—direct to the Department before 1st March, 1905.

2. No application for a loan for the purchase of a bull will be considered except in cases where the Department are satisfied that the applicant is a person of *very small means*.

3. No application for a loan for the purchase of a bull will be considered if coming from a locality in which, in the opinion of the Department, there is already a sufficient number of pure bred bulls for the purpose of their scheme.

4. No loan will be granted save for the purchase of a pure bred yearling bull, passed by the Department as suitable for a premium. The bull must be of a breed approved by the County Committee.

5. The purchase price of the bull must be approved of by the Department.

6. A person applying for a loan under this scheme must purchase through the Department, who cannot undertake to consider applications for loans in respect of animals purchased without their knowledge at shows, sales or from private individuals.

7. Before taking possession of the bull the applicant must pay to the Department's representative—(1) one-third of the approved purchase price, (2) the stamp duty, and (3) the charge for insurance

(see Clause 12). Further, he must sign a form of undertaking to have the necessary form of guarantee for repayment duly signed and completed.

8. As soon thereafter as possible, the approved applicant and two approved solvent sureties shall sign a form of guarantee to repay to the Department the amount which will be advanced by them—viz., two-thirds of the purchase price—in two equal annual instalments, at the end of one and two years respectively, from the date of payment of the full purchase price to the vendor by the Department, together with interest at the rate of  $2\frac{1}{2}$  per cent. on the outstanding balance.

9. In the case of an association the person in whose charge the bull is to be placed must, with two other approved members of the association in their capacity of private individuals, guarantee repayment of the loan.

10. Should the bull be awarded a county premium (1) the person in whose favour the loan is being granted must conform to the regulations of the Department's scheme for the improvement of the breeds of cattle, or any modifications therein made, with the approval of the Department, by the County Committee; and (2) the amount of such premium shall be paid to the individual in possession of the bull, after the provisions of the general scheme have been complied with.

11. Each bull purchased under this scheme must be insured with the Department by the applicant for a loan.

12. The charge for insurance against death shall be 5 per cent. on the full purchase price. This charge must be paid to the Department, who will, subject to all the regulations of this scheme being complied with, insure the bull as from the date of payment of such charge until the loan has been repaid, but in no case will the insurance cover a period longer than two years from date of payment of this charge.

13. In the event of the death of the bull within twelve months from the date of payment to the Department of the charge for insurance, a sum equal to three-fourths of the loan will be credited by the Department in reduction of the amount due by the applicant in respect of loan and interest.

14. If the bull dies in the second year, provided the first instalment was paid to the Department before the expiration of the period allowed for repayment thereof, under Clause 8, a sum equal to one-half of the original loan will be credited by the Department in reduction of the balance due by the applicant in respect of loan and interest.

The insurance, however, shall be cancelled in the event of the first instalment not being paid within the period prescribed under Clause 8. (See also Clause 16.)

15. The individual in whose favour the loan is being granted must observe the following conditions:—

- (1.) In the event of the bull getting ill or lame he must, without delay, give notice in writing or by telegram to the Department. Like notice must also be given (a) in the event of any accident or injury occurring to the bull, and (b) in case of the death of the bull.

- (2.) He must take all reasonable precautions to prevent the bull from coming into contact with any animal suffering from disease.
- (3.) He must provide proper accommodation for the bull and care him in a proper manner, to the satisfaction of the Department.
- (4.) He must procure at his own expense a syringe and disinfecting materials for the washing of his bull after each service, in accordance with the instructions given in the Department's leaflet No. 13 on contagious abortion in cows.
- (5.) He must procure at his own expense the services of a veterinary surgeon where necessary.
- (6.) In the case of the death of the bull he must forward a certificate from a veterinary surgeon as to the cause of death.

16. The non-observance of any one of the conditions of this scheme will render the insurance void, and all moneys paid therefor will be forfeited to the Department.

17. The Department shall have the right to inspect the bull at any time, and to remove him at any time, if it is found, in the opinion of the Department, that he is not being properly cared, or in the event of an instalment of principal and interest being in arrear for more than four weeks.

18. The Department reserve the right to brand or mark the bull, and to inspect it from time to time.

19. The Department also reserve the right to apply the tuberculin test, at their own expense, to any bull purchased by means of a loan from the Department.

20. The bull shall remain the property of the Department until all instalments of principal and interest are paid off.

21. The Department reserve the right to refuse any application for a loan without assigning any reason for such refusal.

22. The granting of a loan does not imply that a premium will be awarded in respect of the bull.

23. The Department will, as far as possible, endeavour to procure suitable animals for persons to whom loans are to be granted, but they cannot undertake to supply bulls at a price fixed by the applicant.

24. The decision of the Department in all matters relating to these loans shall be final.

Forms of application for loans can be had from the Department.

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## SUBSIDIES TO AGRICULTURAL SHOWS.

1905.

1. In 1905 County Committees of Agriculture and Technical Instruction may, subject to the approval of the Department, make grants in aid of established Agricultural, Poultry, Horticultural, and Farm Produce Shows, held under the auspices of an Agricultural Society, which has duly furnished, before the 1st February,

1905, to the Department through such County Committees the following particulars in respect of each show held by the Society in 1904, viz. :—

- (1.) An audited balance sheet, setting forth in detail the financial position of the Society after all liabilities have been discharged.
- (2.) A list certified by the Secretary of the Show Society setting forth the amounts actually collected in local subscriptions from private individuals in 1904.

Any Society which fails to furnish these particulars, or such further information as the Department may require, shall not be eligible to receive a subsidy.

2. In approving of the amount to be granted to any particular show, the Department will take into consideration :—

- (1.) The amounts actually collected in local subscriptions from private individuals in 1903 and 1904.
- (2.) The total value of prizes awarded in 1904, and the cost of administration.
- (3.) The regard paid by the Society to the furtherance of the Department's Live Stock, Poultry, and other county schemes.
- (4.) The amount set aside for classes confined to small farmers.

3. The prize schedule for 1905 must, prior to publication, be submitted through the County Committee to the Department for approval in writing. The Department will not consider any schedule unless it has previously received the approval of the County Committee.

4. The joint contribution from the County Committee and the Department must be acknowledged in the prize schedule.

5. In the case of Live Stock Shows, other than shows confined to horses, provision must be made in the schedule of prizes for the inclusion of classes for Poultry, of the breeds being subsidised by the County Committee, and also for Sheep.

6. Each Society receiving a subsidy under this scheme shall, if required, afford all reasonable facilities for the inspection of their books by the Department, and shall admit the Department's Inspectors to the judges' ring during all adjudications on the day of the show.

7. A portion of the joint fund available under this scheme may be given to new Societies, provided the Department are satisfied :—

- (1.) That there is need for such new Societies in the county ;
- (2.) That adequate local support is forthcoming ; and
- (3.) That the rules and financial proposals of the Society are deemed satisfactory.

8. Only in very exceptional circumstances will the Department be prepared to sanction the holding of local exhibitions for the award of prizes by a County Committee.

9. The Department cannot undertake to supply the services of a judge or demonstrator for any show or local exhibition as they have done in previous years.



10. Immediately after the show the Secretary of the Society shall furnish to the Department, through the Secretary of the County Committee, a certificate of the amount actually awarded in prizes at the show, and the Department may then instruct the Secretary of the County Committee to lodge to the credit of the Show Society the amount of the grant already approved.

11. In all cases of dispute in matters connected with this scheme the decision of the Department shall be final.

The Department recommend that each Agricultural or other Show Society receiving a subsidy under this scheme should invite the County Committee to nominate one or more representatives to act on the Show Committee.

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## SCHEME FOR ENCOURAGING IMPROVEMENT IN THE FLAX-GROWING INDUSTRY, 1904-5.

The following programme has been adopted by the Department for encouraging improvement in the flax-growing industry during the season 1904-5:—

### I.—FIELD EXPERIMENTS.

Field experiments with seeds and manures will be continued. The object of these experiments is to ascertain the influence of certain mixtures of manures on the yield and quality of the flax crop. A report on the experiments carried out in 1903 has appeared in No. 4, Vol. 4, of the Department's *Journal*, and will also be published and distributed in leaflet form.

### II.—RIPPLING EXPERIMENTS.

With a view to testing the influence on the flax of saving the seed by rippling, experiments will be undertaken again in 1904-5 and a report on the results will be published.

### III.—ARTIFICIAL RETTING.

A grant will be made to the Flax Supply Association for the purpose of carrying out experiments to ascertain whether flax retting on the artificial system can be profitably carried out in Ireland.

### IV.—DRYING FLAX STRAW.

Further trials will be made in the drying of unretted straw and storing it for the winter as is done on the Continent.

### V.—CONTINENTAL SYSTEM OF RETTING.

Tests will be made on the Continental system of retting with Irish flax straw. For this purpose a quantity of Irish straw will be sent to Courtrai and treated in the manner usually adopted there.

## VI.—COLLECTION OF STATISTICS.

An attempt will again be made to collect statistics with reference to the flax crop by the distribution amongst scutch mill-owners of sheets to be filled in and returned to the Department.

## VII.—SCUTCHING TESTS.

The scutching trials started three years ago at Carthall, near Coleraine, to test the Continental system of scutching will be continued during 1904-5 with such modifications as previous experience may suggest.

## VIII.—FORMATION OF FLAX SOCIETIES.

The Department, subject to conditions to be prescribed by them, are prepared in a limited number of cases to assist farmers in establishing co-operative flax societies by paying a portion of the salary of an approved manager, and by granting loans for the erection of machinery. Such assistance will be subject to the societies being organised on the basis of all the members entering into a collective guarantee in addition to the share capital, such guarantee to amount collectively to at least 50 per cent. more than the amount of the loan in each case, the amount of the shares and guarantee being, as far as possible, arranged in proportion to the valuation of the members.

Applications for assistance of this nature should be made to the Secretary of the Department. As soon as the Department are satisfied that the conditions are favourable for the formation of a society, an organiser will be sent to the district.

## IX.—PRIZES FOR GROWERS AND OWNERS OF AND EMPLOYEES IN SCUTCH MILLS.

The Department have set aside a sum of money to enable the County Committee in each of the counties interested in flax growing—

- (A.) To hold a number of flax shows on the same lines as in the past three years.
- (B.) To offer prizes to growers for flax on foot.
- (C.) To offer prizes to scutch mill-owners, scutchers, and employees in scutch mills.

*A County Committee may adopt Sections A and B or Sections B and C, or any one of these sections.*

### SECTION A.

For the purpose of this part of this scheme a county may be divided into districts, in each of which a show of scutched flax may be held, at which the following prizes shall be offered :—

#### (A.)—Growers.

First prize, . . . .	3 bags flax seed.
Second prize, . . . .	2       "       "
Third prize, . . . .	1 bag       "

(B.)—*Scutchers.*

Scutchers employed in the mill where the first prize lots were scutched :—

2 bags flax seed.

Scutchers employed in mills where the second prize lots were scutched :—

1 bag flax seed.

(C.)—*Other employees.*

For persons employed in the mill where the first prize lots were scutched :—

2 bags flax seed.

Similar employees in mills where the second prize lots were scutched :—

1 bag flax seed.

(D.)—*Mill-owners.*

*This class may be omitted if the County Committee so desire.*

Owners of mills in which the first prize lots were scutched :—

2 bags flax seed.

Owners of mills in which the second prize lots were scutched :—

1 bag flax seed.

## SECTION B.

For the purpose of this part of this scheme the county may be divided into districts, in each of which prizes for flax on foot shall be offered, *e.g.* :—

(a.) For growers the valuation of whose holding does not exceed £10, and who grow at least half a statute acre of flax.

(b.) For growers the valuation of whose holding exceeds £10 but does not exceed £25, and who grow at least one statute acre of flax.

(c.) For growers the valuation of whose holding exceeds £25 but does not exceed £50, and who grow at least two statute acres of flax.

(d.) For growers the valuation of whose holding exceeds £50 and who grow at least three statute acres of flax.

*N.B.—The limits of valuation in the foregoing classes are not prescribed; they are merely inserted as an indication to County Committees to encourage the small grower.*

When judging growing crops the judge shall take into consideration :—

(a.) Freedom of crop from weeds;

(b.) Uniformity of crop;

(c.) Length and quality of crop.

## SECTION C.

(a.) It is suggested that prizes be offered in each county under this section as follows:—Three or more prizes to be competed for by the owners of scutch mills.

(b.) A like number of prizes to the scutchers employed in the successful competing mills.

(c.) A like number of prizes to other employees engaged in the successful mills.

When inspecting scutch mills the judge shall take into consideration:—

(a.) The general arrangements (buildings, machinery, storage).

(b.) The quality of scutching (handling of flax).

(c.) Care and disposal of tow.

(d.) General management.

## GENERAL REGULATIONS.

1. A County Committee adopting this scheme shall appoint a special sub-committee for flax, which must be restricted to six members, each of whom should be an experienced grower or scutcher of flax; and this sub-committee shall be given full authority to administer the county scheme when sanctioned in writing by the Department.

2. The sub-committee shall be responsible for organising shows under Section A, and for making all arrangements in connection with Sections A, B, and C; but no payments under this scheme shall be authorised, except by the County Committee.

3. The County Committee shall, by means of advertisements in the local papers and by posters, invite applications on special forms from persons in the county desirous of competing for the prizes offered under this scheme.

4. All prizes under this scheme, whether in connection with Section A, B, or C, shall be paid in flax seed only, which will be procured by the Department and sold to the County Committee at cost price.

5. Not later than the 26th September, 1904, and not less than six weeks before the date of the first show, the County Committee must submit for the approval of the Department, on the form provided for the purpose, a complete statement showing:—

In regard to Section A—(1) the classes to be provided at each show; (2) the quantity of flax to be exhibited by one person in each class, which should not be less than 24 stones; (3) the number and value of the prizes to be offered; (4) the place, suggested date, and hour of each show—(N.B.—Two or more alternative dates, being flax market days, should be suggested for each show); (5) the instructions to exhibitors, together with such conditions of award, in addition to the compulsory provisions in the following clauses as the Committee may consider desirable.

In regard to Section B—(1) the number of districts into which it is proposed to divide the county: (2) the limits of valuation in each class; (3) the number and value of prizes in each class.

In regard to Section C—particulars as to the prizes to be offered

to mill-owners, scutchers, and other employees respectively. (N.B. —A list of the names and addresses of the competing scutch mill-owners, the number of scutchers and other employees engaged in each such mill, must be submitted to the Department on the form provided for the purpose within six days after the close of the period for receiving entries.)

6. All growers of flax shall be eligible to compete for prizes in Sections A and B, subject to the regulations of this scheme.

7. Under Section A no grower shall be paid more than one prize during the season, and under this same section no individual can receive a prize both as a grower and as a mill-owner.

8. If, in the opinion of the judge, the flax exhibited under Section A, the crop inspected under Section B, or the work inspected in scutch mills under Section C, does not show sufficient merit, the prizes must be withheld.

9. If it be discovered that any fraud, deception, or dishonest practice has been committed, either in connection with the preparation or ownership of the scutched flax or growing flax, or in any representation regarding exhibits of growing crop or scutch mills which may have affected, or have been intended to affect, the decision of the judge or judges, the offending person shall be disqualified, and shall be debarred from obtaining any future benefits under the Department's scheme. He shall also forfeit any claim in respect of prizes awarded under this scheme. The Department reserve to themselves the right to publish the names of such persons if deemed expedient.

10. No action shall be taken by any local authority towards putting any portion of this scheme into operation until the sanction of the Department to the Committee's proposals has been obtained in writing. The scheme, when sanctioned by the Department, must be considered as final for the year.

11. The County Committee shall, subject to the approval of the Department, appoint a competent judge or judges under this scheme. The person appointed must not be a resident of the county in which he is to act.

12. (1.) Not later than six days after the holding of each show the Secretary of the County Committee shall submit to the Department for approval, on the form provided for the purpose, a statement showing the name and address of each of the prize-winners under Section A, and the quantity of flax seed to which each winner is entitled. (2) Similar returns in respect of competitions in Section B and Section C should be furnished to the Department within one week after the work of judging has terminated. (3) The awards will not be final until the sanction of the Department has been conveyed in writing to the Secretary.

13. The Secretary of the County Committee shall keep a separate account of expenditure in connection with each section of this scheme, and shall furnish same to the Department when required.

14. Subject to the foregoing regulations being complied with, the Department will be prepared to refund County Committees 50 per cent. of all authorised expenditure under this scheme.

15. The decision of the Department in all matters of dispute in connection with this scheme shall be final.

## SCHEME OF SUBSIDIES TO IRISH DRAUGHT, HUNTER, AND HALF-BRED SIRES, 1905.

1. The Department are prepared to subsidise for any part of Ireland, subject to the regulations of this scheme, a number of approved sires of the Hunter or Irish Draught type, as well as ponies suitable for the poorer districts.

2. The Department will publish a list of the approved Stallions accepted for the purpose of this scheme in 1905.

Copies when issued may be had free on application.

Owners of suitable Stallions, which have not previously been inspected, are invited to apply to have their horses placed on this list subject to the provisions of this scheme.

3. Forms of application for the purpose of this scheme may be had from the Department.

One of these forms, accurately filled up in every particular, and signed by the owner or his agent, must be lodged in, or sent by post so as to reach, the offices of the Department not later than the 31st October, 1904.

4. (1.) Owners offering their stallions for service under this scheme must, if required, submit them to inspection and veterinary examination by the Department. Notice of the centres to which the horses are to be brought for inspection will be given.

(2.) No application for the subsidising of a stallion under this scheme will be considered unless the owner agrees to accept for service by that stallion at least fifty mares the property of the farmers whose tenement valuation does not exceed £30, at a fee not exceeding £1 per service, and 2s. 6d. groom's fee. In consideration of the service of fifty such mares the Department will be prepared to grant the owner of an approved sire a premium not exceeding £50 for the season.

(3.) No application will be considered in which every particular required in the form of application is not supplied.

(4.) Stallions approved under this scheme will be accepted for particular districts only, and shall not, without the written consent of the Department, be removed to another district. If a stallion is removed without such consent to a district for which he was not accepted the owner of such stallion shall forfeit all claim to the benefits of this scheme.

(5.) All sires which have received the Department's certificate under the Scheme for the Examination of Half-bred Stallions in 1904, will be accepted without further inspection, but an application in respect of a sire which has, on inspection, been previously rejected as unsuitable shall not be considered under this scheme.

5. Stallions offered under this scheme may be inspected for their general merit and fitness for the purposes of the scheme. Such inspection shall be carried out by one or more Inspectors appointed by the Department. If the stallion has been to stud, evidence of his fruitfulness and, where practicable, of the character of his stock, must be produced if required. Inspection for general fitness, when deemed necessary, shall, as far as possible, precede veterinary examination.

6. (1.) The Veterinary examination shall be carried out by one or more qualified Veterinary Surgeons appointed by the Department.

(2.) No stallion shall be rejected as unsound unless suffering from one of the following diseases:—Cataract, roaring, whistling, ringbone, sidebone, unsound feet, spavin, curb.

7. The inspection for general merit and fitness and the veterinary examination of stallions offered under this scheme may be dispensed with in cases where evidence of suitability and soundness have been sufficiently established to satisfy the Department.

8. The Department cannot undertake to disclose their reasons for the non-acceptance of any animal, and they reserve to themselves the right without assigning any reason therefor or without inspection or veterinary examination to decline to accept any stallion for the purposes of this scheme. No right of appeal shall lie in the case of any stallion rejected under this scheme.

9. The owner shall advertise the sire to the satisfaction of the Department.

10. (1.) Mares to be served under the provisions of this scheme must be the *bona fide* property of farmers or herds.

(2.) No one farmer shall be entitled to have more than one mare served under this scheme. Before service the owner of each mare, if a farmer, must furnish the stallion owner with a certified statement of his valuation.

11. The owner of a stallion accepted under this scheme shall not, before the stipulated number of mares have been served, reserve the use of his stallion for the mares of any individual or for the members of any society; but must, subject to the provisions of Clause 15, allow his stallion to serve mares in the order in which they are presented.

12. The service fee fixed under Clause 4 shall be paid by the owner of the mare to the owner of the stallion at the time of first service, or at such other time as may be agreed upon between them.

13. Not earlier than the first August, 1905, and not later than 1st September, 1905, the owner of the stallion shall forward to the Department a form containing a return of the names, addresses, and original certificates of valuation of the persons whose mares have been served, together with the dates of such service, as well as a statutory declaration, signed before a magistrate other than the owner of the stallion, certifying that the said mares have been duly served, and that all the regulations of this scheme have been strictly complied with. As soon thereafter as the Department are satisfied as to the fulfilment of the conditions of this scheme, payment of the premium—or part of the premium—will be made to him by the Department. Forms for the declarations required by this clause may be had on application to the Department.

14. In the event of the stallion being unable from any cause to complete the prescribed number of services, the Department reserve the right to withhold the premium, or any part of it, or in any other way to deal specially with the case, according as the circumstances may require.

15. The stallion owner has the right to refuse the service of his stallion under this scheme in the following circumstances, viz.:—

- (1.) Where the valuation of the owner of the mare exceeds £30.
- (2.) Where the owner of the mare refuses to pay the fee at time of first service,
- (3.) Where the mare is believed to be suffering from a contagious disease.

16. In all cases of dispute in matters connected with this scheme, the decision of the Department shall be final.

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#### SCHEME OF INSTRUCTION IN AGRICULTURE, 1904-5.

1. The Department are prepared, provided a suitable Instructor in Agriculture can be obtained, to approve of the appointment of at least one such person for each county in Ireland. In the case of new appointments no person shall be eligible for an Instructorship in the county of which he is a native, or in which he resides permanently.

2. The Department will, as far as possible, assist the County Committee in obtaining an Instructor, by supplying the names of persons qualified for the post.

3. The remuneration of the Instructor shall not, except in special cases, exceed £200 per annum, inclusive of maintenance and hotel expenses, in addition to expenses of locomotion, which include second or third class railway fare as decided by the County Committee, car hire when necessary, or a bicycle allowance of 2*d.* per mile in lieu thereof.

4. The appointment of the Instructor shall be determinable at any time by three months' notice in writing on either side.

5. It will be the duty of the Instructor to deliver courses of lectures on agricultural subjects, such as soils, manures, seeds, pastures, crops and their cultivation, breeding, feeding, and management of live stock; to visit farms; to conduct such experiments and demonstrations in spring and summer as may be approved by the Department; to select suitable land for this purpose; to supervise the sowing of the seeds and supply of manures and the keeping of the plots free from weeds; to weigh the produce, tabulate the figures and prepare a report on the results; to reply to letters from farmers seeking information; to advise farmers how they may avail themselves of the Department's Live Stock Schemes and of the Department's Seed-Testing Station; to make known the provisions of the Fertilizers and Feeding Stuffs Act; to advise farmers how they can best avail themselves of all schemes which may be adopted by the County Committee and by the Department, and how they may take advantage of agricultural organisation; to report to the Department and to the County Committee regarding the progress of his work, either weekly or otherwise, as may be required; and generally to give his whole time to the work and do all in his power to further the interests of agriculture in the county.



The Instructor may also be required to act as judge in connection with the Scheme of prizes for cottages and small farms in a county other than that in which he acts as Instructor.

6. For the purposes of this scheme the county should be divided into circuits, each comprising not less than five centres. The Instructor, unless in exceptional cases, should work for three or four weeks in each circuit, and deliver one lecture per week at each centre during that time. The Instructor will, when invited to do so, visit either on the day of the lecture or on the following day, any of the farms in the neighbourhood, and give such information on practical subjects as the circumstances of the case may suggest.

The County Committee are alone responsible for the selection of centres and arrangement of lectures. No work of this nature should be undertaken by the Instructor, though it is desirable that he should be consulted.

7. It will be the duty of the County Committee to select centres at which the lectures will be given, and to appoint a local committee with an honorary secretary at each centre who should select the school or other building and arrange for the hiring, lighting, and warming of the room in which the lectures will be delivered.

It will also be the duty of the County Committee to undertake the responsibility of seeing that the Instructor's time is fully and usefully employed.

The County Committee shall keep a separate account of all expenditure under this scheme, and shall furnish detailed statements of such expenditure as may from time to time be required by the Department.

8. Lectures should be arranged to be given in school-rooms or other suitable public rooms in the evenings, and should be held in rural centres. Towns and the larger villages should be avoided, as experience has shown that the greatest success attends those lectures which are given in the rural parts of a county, especially when the lectures are delivered in a district where the greatest number of farmers is to be found. The local committee at each centre should be responsible for appointing a representative chairman for each lecture as well as for the distribution of the short syllabus of the lectures which will be prepared by the lecturer as soon as he is appointed. The local committee should undertake to have posters, which will be supplied by the Secretary of the County Committee, effectively displayed throughout their district. Each lecture should be followed by a discussion, during which farmers will be invited to ask questions relative to their business.

9. The lectures should commence early in autumn, and be continued until the end of February.

10. No action shall be taken by the County Committee towards putting this scheme, or any part thereof, into operation until the sanction of the Department has been obtained in writing.

## SCHEME FOR ENCOURAGING IMPROVEMENT IN THE POULTRY-KEEPING INDUSTRY, 1904-5.

1. The Department are prepared, provided a suitable Instructor in Poultry-Keeping can be obtained, to approve of the appointment of at least one such person for each County in Ireland. In the case of new appointments no person shall be eligible for the position of Instructor in the county of which he or she is a native or in which he or she permanently resides.

2. The Department will, as far as possible, assist County Committees in obtaining an Instructor by supplying the names of persons qualified for the post.

3. Unless in exceptional circumstances the remuneration of the Instructor shall not exceed £2 per week, in addition to expenses of locomotion, which include second or third class railway fare, as decided by the County Committee, car hire when necessary, or a bicycle allowance of 2d. per mile in lieu thereof.

4. The appointment of the Instructor shall be determinable at any time by four weeks' notice in writing on either side.

5. It will be the duty of the Instructor to deliver courses of lectures on poultry-keeping, including the selection of breeds, the hatching and rearing of chickens, the feeding and housing of poultry, and the marketing of the produce; to give demonstrations and lessons on cramming fowls and on the plucking, trussing, and preparation of poultry for market; to visit poultry runs, and give such practical advice as may be desired by poultry-keepers, to inspect the egg distribution and turkey stations referred to in Clauses 11 and 13, to report to the Department and to the County Committee regarding the progress of his or her work either weekly or otherwise as may be required, and generally to give his or her whole time towards promoting improvement in poultry-keeping in the county.

6. For this purpose the county should be divided into circuits, each comprising not less than five centres. The Instructor, except in special cases, should work for at least four weeks in each circuit, and deliver one lecture per week at each centre during that time. The Instructor will, when invited to do so, visit either on the day of the lecture or on the following day, any of the poultry runs in the neighbourhood, and give such information on poultry-keeping as the circumstances of the case may suggest.

The County Committee are alone responsible for the selection of centres and the arrangement of lectures. No work of this nature should be undertaken by the Instructor, though it is desirable that he or she should be consulted.

7. It will be the duty of the County Committee to select centres at which the lectures will be given and to appoint a local committee, with an honorary secretary, at each centre, who should select the school and arrange for the hiring, lighting, and warming of the room in which the lectures will be delivered.

It will also be the duty of the County Committee to undertake the responsibility of seeing that the Instructor's time is fully and usefully employed.

The County Committee shall keep a separate account of all expenditure under this scheme, and shall furnish detailed statements of such expenditure as may from time to time be required by the Department.

8. Lectures should be arranged, wherever possible, to be given in schoolrooms or other suitable public rooms in the evenings, and should be held in rural centres only. Towns and the larger villages should be avoided, as experience has shown that the greatest success attends those lectures which are given in the rural parts of a county, especially when the lectures are delivered in districts where the greatest number of those interested in poultry-keeping is to be found. The local committee at each centre should be responsible for appointing a representative chairman for each lecture, as well as for the distribution of the short syllabus which will be prepared by the lecturer as soon as appointed. The local committee should undertake to have posters, which will be supplied by the Secretary of the County Committee, effectively displayed throughout the circuit. Each lecture should be followed by a discussion, during which farmers and others interested in poultry-keeping will be invited to ask questions relative to their business.

9. The lectures should commence early in autumn and be continued until the end of the hatching season. If employed during the summer months, the Instructor should, during that season, visit poultry runs, inspect egg distribution stations, and give lessons and demonstrations in cramming, trussing, &c.

10. The Instructor, after the completion of each course of lectures, or at least once during every five weeks, will be required to visit all the egg distribution stations in the county and submit reports to the County Committee and to the Department.

#### DISTRIBUTION OF SETTINGS OF EGGS OF PURE BREEDS.

##### *Hens and Ducks.*

11. In counties where instruction in poultry-keeping has been provided, the Department are prepared to sanction a limited number of premiums of £5 each being awarded to selected applicants who distribute during the season at least 70 settings of eggs; those who distribute less will be paid in proportion to the number distributed. No maximum number of settings to be distributed is fixed, but owners of stations must continue selling eggs at the fixed price until May 31st. When the demand for settings is not pressing, the owner may set eggs for his own use, but such settings will not count towards a premium. Applicants must agree to comply with the following conditions:—

(1.) To keep one pure breed of hens only. In exceptional cases the Department may approve of more than one pure breed being kept, provided they are satisfied that the selected person, houses, runs, birds, &c., are suitable.

(2.) To sell or destroy any existing fowl on the farm of

which the Instructor or the Department may disapprove, and not to bring on the farm during the period for the distribution of eggs fowl of any description without the sanction of the Instructor or of the Department.

(3.) To keep no male birds on the farm other than those used for stock purposes of the breed or breeds of fowl approved of.

(4.) When a premium is claimed for hens alone, to keep not less than thirty or more than sixty of the selected breed. If the premium is claimed in respect of hens and ducks, not less than five ducks and twenty-five hens must be kept, or ten ducks and twenty hens, but the total number of birds to be kept at any one station should not exceed sixty. At least one cock or cockerel must be kept for every ten hens or pullets, and one drake for every five or six ducks.

(5.) To provide proper housing where such does not already exist, and in the case of two breeds being kept to provide a separate run for each to the satisfaction of the Instructor or the Department. The size of run for any flock of birds will require to be at least twenty square yards per bird.

(6.) To feed and care for the birds in such a manner and in such a way as the Instructor and the Department may require.

(7.) To supply, during the whole of the season, settings of eggs from these birds to any person in the county at 1s. per dozen (the purchaser to bear the cost of package and carriage), and to replace infertile eggs that are returned within one month from the date on which they were sent out.

In special cases the Department may sanction an increase in the price of eggs, provided the County Committee show sufficient reasons for so doing.

(8.) To stamp all eggs given out with a stamp provided for the purpose by the County Committee.

(9.) To keep in a special book provided by the County Committee an accurate record of all eggs laid and distributed. This book must be sent to the Secretary of the County Committee or to the Department when asked for by either of these bodies. The books must be returned to the Secretary of the County Committee at the end of the distributing season, which will commence on the 1st January and terminate on the 31st May. (See Clause 17.)

(10.) To permit the Instructor or the Department to inspect the birds at any time.

Any infringement of the above rules may entail the cancellation of the premium.

12. An additional grant of 50 per cent. of the actual cost, but in no case exceeding £2, may be made to the selected persons who provide themselves for the purpose of this scheme with portable wooden fowl-houses approved by the Department. This will apply only to persons who are taking up the scheme in 1904-5 for the first time. No grant will be made in respect of improvements in an existing house, and if a new house is obtained it must be portable.

*Turkeys.*

13. Premiums of £2 each may be offered to persons who are prepared to comply with the following conditions:—

(1.) To keep one or more pure bred American Bronze stock turkey cocks for the service of turkey hens, the property of any persons residing in the county, at a fee of 6*d.* per service. Each cock must serve twenty hens exclusive of the owner's. If a smaller number are served, the premium will be proportionately reduced. The owner may refuse to allow the bird to serve more than twenty hens. Turkey cocks will require to be at least twelve months old, and not less than the following weights:—One-year-old birds, 22 lbs.; adult birds, 28 lbs. Birds older than three years are not eligible for premiums.

(2.) To provide proper housing accommodation, and to feed and care for the bird or birds in such a manner as the Instructor or the Department may require.

(3.) To keep in a special book, provided by the County Committee, an accurate record of services. This book must be sent to the Secretary of the County Committee or to the Department when required, and in any case must be returned to the Secretary of the County Committee not later than the 7th June.

(4.) To permit the Instructor or the Department to inspect the birds at any time.

Any infringement of the above rules may entail the cancellation of the premium.

A premium may be granted to a turkey cock selected in 1904, provided the bird is suitable in every respect, and is located at a different centre either in the same or another county.

14. An applicant will be eligible for only one premium either for hens or for hens and ducks combined, but he will, in addition, be eligible to hold a premium for turkeys. No premium, however, will be given for ducks alone.

One of the following breeds of hens and ducks must be selected:—

**HENS.***Laying Breeds.*

Minorcas. White Leghorns. Brown Leghorns.

*General Purpose Breeds*

Houdans. Plymouth Rocks. Orpingtons. Faverolles.  
White Wyandottes.

**DUCKS.**

Aylesbury. Pekin. Indian Runner.

15. As soon as the Instructor has been appointed and the number of premiums proposed to be awarded has been approved of by the Department, the County Committee shall invite applications from persons in the county who already possess, or are willing to purchase, pens of the approved pure breeds of fowl or ducks, or to keep one or more pure-bred turkey cocks, as above, and who are prepared to comply with the above conditions. When these applications have been received the County Instructor in Poultry-Keeping will, as soon as possible, inspect and report to the County Committee as to the number of suitable applicants. The names of the selected applicants, with full particulars as to the breeds, number of birds, and housing, should then be submitted for the approval of the Department, who may thereupon further inspect the selected farms, and submit a list of those of which they approve to the County Committee for their final selection.

16. The Department will not consider applications from a county in respect of premiums under this scheme later than 1st December, 1904.

On account of the difficulty of procuring stock birds of pure breeds late in the season, it is recommended that County Committees who intend to adopt this scheme should, if possible, have all arrangements completed prior to the 1st January, 1905.

17.—(1.) Not later than 7th June, the selected applicants for premiums must forward to the Secretary of the County Committee the record books referred to in Clauses 11 (9), and 13 (3), accompanied by a statutory declaration certifying that the entries in these books are correct, and that all the conditions of this scheme have been complied with.

(2.) As soon as the Department are satisfied as to the fulfilment of the conditions of this scheme, the Secretary of the County Committee will be notified that payment may be made by the Committee of the premiums or portions thereof payable under this scheme.

(3.) Any premium not applied for by the 7th June shall be considered as having lapsed.

Forms for the declaration required by this clause may be had on application to the Secretary of the County Committee.

18. No action shall be taken by the County Committee towards putting this scheme, or any part thereof, into operation until the sanction of the Department has been obtained in writing.

SPECIAL ATTENTION IS DIRECTED TO CLAUSE II.

A 41.  
04.

## SCHEME OF INSTRUCTION IN HORTICULTURE, 1904-5.

1. The Department are prepared, provided a suitable Instructor in Horticulture can be obtained, to approve of the appointment of at least one such person for each county in Ireland. In the case of

new appointments no person shall be eligible for the position of Instructor in the county of which he is a resident, or in which he permanently resides.

2. The Department will, as far as possible, assist the County Committee in obtaining an Instructor, by supplying the names of persons qualified for the post. In making appointments under this scheme preference will be given to candidates who are qualified to give instruction in Bee-keeping also.

3. The remuneration of the Instructor shall not, unless in exceptional circumstances, exceed £2 per week, in addition to expenses of locomotion, which include second or third-class railway fare, as decided by the County Committee, car hire when necessary, or a bicycle allowance of 2*d.* per mile in lieu thereof.

4. The appointment of the Instructor shall be determinable at any time by four weeks' notice in writing on either side.

5. It will be the duty of the Instructor to give demonstrations and to deliver lectures on horticultural subjects such as soils, manures, vegetable, fruit, and flower cultivation, plant diseases, and insect pests; to visit gardens and orchards, and give practical demonstrations on spraying, planting, pruning and grafting of fruit trees; to conduct such experiments and other demonstrations in the spring and summer as may be approved by the Department; to select suitable land for this purpose; to supervise the sowing of the seeds and application of manures, and the keeping of the plots free from weeds; to weigh the produce, tabulate the figures, and prepare a report on the results; to reply to letters from those seeking his advice on horticultural subjects; to report to the Department and to the County Committee on the progress of his work either weekly or otherwise, as may be required; and generally to give his whole time to the work and to do all in his power to further the interests of horticulture in the county.

6. For the purposes of this scheme the county should be divided into circuits. The Instructor should work for three or four weeks in each circuit, and give lectures and demonstrations during that time. The Instructor will visit gardens or orchards in the district, and give such information on practical subjects as the circumstances of the case may suggest.

The County Committee are alone responsible for the selection of centres for lectures and demonstrations. No work of this nature should be undertaken by the Instructor, though it is desirable that he should be consulted.

7. It will be the duty of the County Committee to select centres at which the lectures and demonstrations will be given, and to appoint at each centre a local committee, with an honorary secretary, who should select the school and arrange for the hiring, lighting, and warming of the room in which the lectures will be delivered.

It will also be the duty of the County Committee to undertake the responsibility of seeing that the Instructor's time is fully and usefully employed.

The County Committee shall keep a separate account of all expenditure under this scheme, and shall furnish detailed statements of such expenditure as may from time to time be required by the Department.

8. Lectures should be arranged to be given in school-rooms or other suitable public rooms in the evenings, and should be held in rural centres. Towns and the larger villages should be avoided, as experience has shown that the greatest success attends those lectures which are given in the rural parts of a county. The local committee at each centre should be responsible for appointing a representative chairman for each lecture as well as for the distribution of the short syllabus of the lectures which will be prepared by the lecturer as soon as he is appointed. The local committee should undertake to have posters, which will be supplied by the Secretary of the County Committee, effectively displayed throughout their district. Each lecture should be followed by a discussion, during which persons interested in horticulture will be invited to ask questions.

9. Demonstrations should commence early in autumn and be continued throughout the whole year.

10. In each circuit one demonstration plot may be selected for the purpose of growing vegetables, flowers, and fruit, and showing improved methods of cultivation. The seeds, manures, and fruit trees, and, if necessary, fencing will be, subject to approval of Department, paid for out of the sum set aside for demonstration plots; the labour to be given gratuitously by the person or persons providing the plots, and the produce to be the property of the same persons.

11. The County Committee may purchase fruit trees, shrubs, or plants, in bulk, and resell them at cost price, including carriage, to farmers and cottagers in the county. As, however, it has come to the knowledge of the Department that trees and plants infested with disease have been imported into Ireland, it will be necessary for County Committees who intend to put this clause into operation to invite tenders from nurserymen and before acceptance to submit them to the Department for examination. The Department may, if they think it necessary, inspect the trees, &c., that are offered for sale, and satisfy themselves that they are suitable and free from disease.

12. No action shall be taken by the County Committee towards putting this scheme, or any part thereof, into operation until the sanction of the Department has been obtained in writing.

A 42  
04.

## SCHEME OF INSTRUCTION IN BEE-KEEPING,

1904-5.

1. The Department are prepared, provided a suitable Instructor in Bee-Keeping can be obtained, to approve of the appointment of at least one such person for each county in Ireland.

2. The Department will, as far as possible, assist the County Committee in obtaining an Instructor, by supplying the names of persons qualified for the post.

3. The remuneration of the Instructor shall not exceed 10s. per day when employed by the day, or £2 per week when employed by the week, in addition to third-class expenses of locomotion.



4. The appointment of the Instructor shall be determinable at any time by a week's notice in writing on either side.

5. It will be the duty of the Instructor to give instruction in the principles and practice of modern bee-keeping, mainly by means of demonstrations at centres from which application is made through the Secretary of the County Committee for his services, to deal with diseases of bees, to reply to letters from those seeking his advice, to report to the Department and to the County Committee on the progress of his work, either weekly or otherwise, as may be required, and generally to assist in the promotion of bee-keeping in such a manner as the County Committee, with the approval of the Department, may direct. The Instructor will, when invited to do so, visit, either on the day of the demonstration, or on the following day, any apiaries in the neighbourhood, and give such practical information as the circumstances of the case may suggest.

6. The Instructor shall report to the County Committee on all cases of foul brood which may come under his notice. He may, subject to the consent of the owner of the bees being previously obtained by him, destroy infected stocks by burning them, and shall take all due precautions against the spread of the disease. He must advise in writing the County Committee of each case in which stocks are so destroyed, and the County Committee may, if they think fit, pay to the owners of such stocks a sum not exceeding 5s. for each stock destroyed, provided that the amount set aside in the county scheme for compensation under this clause shall not be exceeded.

7. It will be the duty of the County Committee to select centres at which the lectures and demonstrations will be given, and to appoint at each centre a local committee, with an honorary secretary, who should select the school or other building and arrange for the hiring, lighting, and warming of the room in which the lectures will be delivered.

It will also be the duty of the County Committee to undertake the responsibility of seeing that the Instructor's time is fully and usefully employed.

The County Committee shall keep separate accounts of all expenditure under this scheme, and shall furnish detailed statements of such expenditure as may from time to time be required by the Department.

8. Lectures should be arranged to be given in schoolrooms or other suitable public rooms in the evenings, and should be held in rural centres. Towns and the larger villages should be avoided, as experience has shown that the greatest success attends those lectures which are given in the rural parts of a county. The local committee at each centre should be responsible for appointing a representative chairman for each lecture. The local committee should undertake to have posters, which will be supplied by the Secretary of the County Committee, effectively displayed throughout their district. Each lecture should be followed by a discussion, during which persons interested in bee-keeping will be invited to ask questions relative to their business. The County Committee are

alone responsible for the selection of centres and arrangement of lectures. No work of this nature should be undertaken by the Instructor, though it is desirable that he should be consulted.

9. No action shall be taken by the County Committee towards putting this scheme, or any part thereof, into operation until the sanction of the Department has been obtained in writing.

A 43  
04.

## INSTRUCTION IN BUTTER-MAKING.

1904-5.

1. The Department are prepared, provided qualified Instructors can be obtained, to approve of the appointment of an Instructor in butter-making in each county. In the case of new appointments no person shall be eligible for the position of Instructor in the county of which she is a native or in which she permanently resides.

2. The Department will, as far as possible, assist the County Committee in obtaining an Instructor, by supplying the names of persons qualified for the post.

3. The remuneration of the Instructor shall not exceed £2 per week, in addition to expenses of locomotion, which include second or third class railway fare as decided by the County Committee, car-hire when necessary, or a bicycle allowance of 2d. per mile in lieu thereof.

4. The appointment of the Instructor shall be determinable at any time by four weeks' notice in writing on either side.

5. The instruction will take the form of daily lessons on dairying, accompanied by practical instruction in butter-making. Each course should extend for a period of not less than two, and not more than four weeks. Not more than twelve pupils should be admitted to each class. Pupils must undertake to attend regularly.

6. On the first day of visiting each centre the Instructor should give a public lecture and demonstration, and during the remainder of the course at that centre should conduct a class daily in which pupils only will take part, but which shall be open to the public.

It will also be the duty of the Instructor to visit home dairies in the county and to give advice as required; to reply to letters from persons seeking advice on butter-making; to report to the Department and to the County Committee on the progress of her work either weekly or otherwise as may be required; and generally to give her whole time to the work of the Committee.

7. It will be the duty of the County Committee to select suitable centres at which classes will be held, and to appoint at each centre a local committee, with an honorary secretary, who will be responsible for the local arrangements necessary for the proper carrying out of the work, and who will be required to comply with the annexed conditions.

It will also be the duty of the County Committee to undertake the responsibility of seeing that the Instructor's time is fully and usefully employed.

The County Committee shall keep a separate account of all expenditure under this scheme, and shall furnish detailed statements of such expenditure as may from time to time be required by the Department.

8. To avoid expense and to ensure success these classes should be held, as far as possible, in schoolrooms or other suitable buildings in rural centres. Unless in exceptional circumstances no class should be held in a large village or town, or near a creamery.

The County Committee are alone responsible for the selection of centres and arrangement of lectures. No work of this nature should be undertaken by the Instructor, though it is desirable that she should be consulted.

9. No action shall be taken by the County Committee towards putting this scheme into operation until the sanction of the Department has been obtained in writing.

#### CONDITIONS REQUIRED OF LOCAL COMMITTEES.

I. To secure premises suitable for a working dairy, if possible not less than 25 feet by 18 feet, or other dimensions affording similar floor space. Either a public room, schoolroom, or barn with good floor, would be suitable for the purpose.

II. To secure a sufficient supply of water.

III. To provide on the premises means of heating at least fifteen gallons of water at one time, for use in cleaning utensils, &c.

IV. To provide sufficient milk or cream for use in the school, the Committee taking responsibility of sale of butter.

After the opening day at each centre about three gallons of milk and six gallons of cream will be required for each day's work. Arrangements should be made to have the milk and the cream delivered in the morning.

V. To guarantee not less than six and not more than twelve pupils to attend on each of the days over which the course of instruction extends.

VI. To arrange for the carriage of utensils from one centre to another. The weight of the utensils is usually from 25 to 30 cwts., and they are somewhat bulky.

The Department recommend the following list of utensils for a travelling dairy school attended by twelve pupils:—

		Approximate Cost.		
		£	s.	d.
6	End-over-End Churns, at £3, . . . . .	18	0	0
6	Butter Workers, at 37s. 6d., . . . . .	11	5	0
6	Butter Boards, at 2s., . . . . .	0	12	0
4	Large Butter Boards, at 3s. 6d., . . . . .	0	14	0
6	Scoops, at 1s., . . . . .	0	6	0
6	Sieves, at 2s. 6d., . . . . .	0	15	0
6	Pairs Scotch Hands, at 2s. 6d., . . . . .	0	15	0
6	Squeegees, at 1s., . . . . .	0	6	0
6	Scrubbing Brushes, at 1s., . . . . .	0	6	0
6	Thermometers, at 1s. 6d., . . . . .	0	9	0

	Approximate Cost.		
	£	s.	d.
6 White Enamelled Buckets, at 5s. 6d., . . . . .	1	13	0
6 Iron Buckets, at 4s. 6d., . . . . .	1	7	0
4 Shallow Tins (Cream), at 4s., . . . . .	0	16	0
1 Pair Scales, . . . . .	0	19	0
1 Set Iron Weights (7, 4, 2, 1, $\frac{1}{2}$ & $\frac{1}{4}$ lb.), . . . . .	0	4	6
1 Set Brass Weights (2, 1, $\frac{1}{2}$ & $\frac{1}{4}$ oz.), . . . . .	0	5	6
1 Set Creamometers, . . . . .	0	6	6
1 Lactometer, . . . . .	0	1	6
1 Gerber Butter-fat Tester (2 Bottles), about . . . . .	2	10	0
1 2-Quart Measure, . . . . .	0	2	6
4 Quart Measures, at 1s. 9d., . . . . .	0	7	0
4 Pint Measures, at 1s. 3d., . . . . .	0	5	0
2 Skimmers, at 8d., . . . . .	0	1	4
1 Hand Separator (17 gallons per hour), . . . . .	7	10	0
1 Portable Boiler (15 gallons), . . . . .	2	14	0
	<hr/> £52 10 10		

The above equipment allows one churn and butter worker, and one set of the smaller utensils for two students.

### AVONDALE FORESTRY STATION.

The Department, having purchased the Avondale Estate for the purpose of establishing there a forestry station, are now prepared to employ a limited number of apprentices desirous of acquiring a training in practical forestry, with a view to undertaking the planting and management of woods for owners of plantations, local authorities, or others.

Avondale is situated about one mile south of Rathdrum station in County Wicklow, in the centre of a well-wooded district. The land attached to the centre will afford ample facilities for practical work in every branch of wood management.

Apprenticeship may extend over one, two, or three years, in accordance with the industry and efficiency displayed by the individual. All the apprentices will be required to work daily in the woods from 7 a.m. to 6 p.m. in summer, and from daylight to dark in winter, with one hour for dinner. An experienced Superintendent will direct the work and give instruction in the proper methods of forestry. A certain amount of theoretical instruction will be provided in the evening. Apprentices will be paid at the rate of 16s. per week, which may be increased to 18s. and 20s. for the second and third years respectively, provided the Department are satisfied with the progress made.

The engagement between the Department and apprentices may be determined at any time by one week's notice. Applicants should be strong, healthy, and at least twenty years of age, and should have a fair general education. Preference will be given to those who have already had some experience in working in woods. They

must be prepared to undergo an examination in English and Arithmetic, which will be held in Dublin on the 15th September, 1904. Selected applicants must enter the Department's employment on the 3rd October, 1904.

Apprentices will be required to find their own board and lodging, but the Superintendent will assist them by supplying the names of persons in the neighbourhood who have suitable accommodation.

Application must be made on a form, to be obtained from the Department, and must reach the Offices of the Department not later than the 31st August, 1904.

Form S. 190.

## COMMERCIAL AND INDUSTRIAL SCHOLARSHIPS.

The Department propose to establish for the year, 1904-5, Commercial and Industrial Scholarships, in accordance with the following general conditions:—

### (a) COMMERCIAL SCHOLARSHIPS.

A limited number of Commercial Scholarships will be granted for the Session 1904-5, tenable for one year only. They will be of the value of £100 each, and will be tenable at such Schools as the Department may approve. The object of these Scholarships is to offer to young men having a sound general education (and as far as possible commercial experience), facilities for one year's training in some higher Institution providing approved courses of instruction, with a view to their employment as teachers of Commercial Subjects in Ireland. The holders will be selected by the Department after consideration of their experience and attainments.

Candidates must be at least twenty-one years of age.

Successful candidates will be required to enter into an undertaking that they will engage in the teaching of Commercial subjects after the termination of their Scholarships.

Candidates must fill in and return addressed to the Secretary of the Department, not later than the 5th October, 1904, Form S. 191, which may be had on application.

### (b) INDUSTRIAL SCHOLARSHIPS.

The Department propose to establish for the Session 1904-5 one Scholarship for those engaged in the Woollen Industry, and one for persons engaged in the Leather and Tanning Industries.

The object of these Scholarships is to enable selected persons (who must already have been engaged in one of the higher branches of the Industry) to take a full course of instruction in an institution providing special courses of an approved character, with a view to training them for the management of such Industry. Candidates

will be required to show that there is a reasonable expectation of their being able to find suitable employment in the Industry in Ireland at the close of their instruction.

The Scholarships will be tenable at some higher Institution, to be approved by the Department, in which these industries are taught. They will be of the value of £80 each, and may be renewable for second and third years at the discretion of the Department.

Selection will be made by the Department on consideration of the qualifications and experience of the applicants.

Candidates must apply for Form S. 192, which should be returned to the Department duly filled in not later than the 5th October, 1904.

Certificates of good character will be required from all applicants, and selected candidates will be required to produce medical certificates of sound health.

The decision of the Department in regard to the selection of Candidates or to any other question arising out of these Scholarships will be final.

## NOTES AND MEMORANDA.

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There was a meeting of the Board of Agriculture on Friday, 26th of August, and a meeting of the Technical Instruction Board on Thursday, 8th of September.

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A Fruit Show, under the auspices of the Department, was held at Ballsbridge on 19th and 20th of October.

**Fruit Show in Dublin.** The entries were very numerous, and exhibits were shown from all parts of Ireland.

At a Conference held on the second day of the Show an address was delivered by the Vice-President of the Department, and an interesting discussion followed.

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The Department have purchased the Avondale Estate and established a forestry station there.\* Avondale

**The Establishment of a Forestry Station.** is situated about one mile south of Rathdrum Railway Station, in County Wicklow, in the centre of a well-wooded district. It is thus well suited for a forestry station, and the adjoining lands will afford ample facilities for practical work in every branch of wood management.

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At the World's Fair, held at St. Louis to commemorate the Louisiana Purchase of 1803, an Irish Section

**Ireland at the World's Fair.** was established. The exhibit was organised so as to include the following sections:—  
 (1) General industries; (2) home, cottage, and art industries; (3) technical education; (4) minerals and raw materials; (5) agriculture; (6) fisheries; (7) statistics and intelligence; (8) historic art, industries and relics; (9) historic engravings, portraits, &c.

\* See p. 147.

The idea of the exhibit generally was carried out by inducing many of the leading manufacturers to put their goods together in the form of combined exhibits. Thus, the Linen Manufacturers' Association of Belfast, representing the largest factories of the North, organised a joint exhibit illustrating the flax and linen industries of Ulster. Close to this exhibit the great rope-making industry of the North was effectively represented.

In a similar manner the distillers of Ireland combined to show the processes of manufacturing the pot-still

**Plan of the Irish  
Section: combined  
Exhibits.**

whiskey, for which Ireland is famous, from the barley grown by the tillage farmers of the south and East. There is likewise a combined exhibit for the woollen industry, which, besides showing the finished product in the shape of cloths, tweeds, homespuns, rugs, blankets, &c., indicated the varieties of Irish wool and the goods which it is especially suited to produce. The hosiery industry of Ireland, which has in recent years made great strides, is represented in all its forms, whether in linen, wool, silk, or cotton. The historic Irish poplin industry is represented by two leading houses.

Amongst the industries represented are the bacon industry, carpets and rugs, cabinetmaking, soap and candles, starch, chemicals, paper, book-binding, publishing, &c. The home, cottage and art industries section is in many respects the most interesting of the exhibit.

**Some of the Industries  
represented.**

It includes lace, crochet, embroidery, homespuns, carpets, curtains, ecclesiastical metal work, mosaic, inlaying, stained-glass, pottery, basket-making, toy-making, and many other industries. The hand-made carpets of Donegal are illustrated by the Congested Districts Board, who also furnish two carpet-weavers and a loom. A homespun weaver, a spinner and a handkerchief embroiderer are among the workers sent to St. Louis by the Board, while with these workers are associated a damask hand-loom weaver and lace workers arranged for by the Department.

The revival of Irish musical-instrument making is illustrated by some of the harps and bagpipes now made in Belfast, and some beautiful specimens of bookbinding and furniture treated in a Celtic spirit came from the same quarter. An interesting exhibit in this section is a display of Belleek pottery, manufactured for this occasion largely from special designs.



The educational section includes a collection of samples of the work now being done by pupils in the

**Other Exhibits.** technical and art schools in Ireland, in which the foundations have been laid for the training of an industrial population, and out of which have already come influences which have produced some results like those indicated above. Amongst the exhibits are specimens of enamelling, mosaic, tapestry, embroidery, stained-glass designs, and specimens of lace and crochet and other of the art crafts as they are at present taught in Irish art schools.

The display of Irish minerals, building stones, and decorative marbles, which formed so remarkable a feature at the Cork Exhibition of 1902, and afterwards at the Imperial Institute, is shown here, and is duplicated in the British section.

The Historic Loan Collection comprises illustrations of Irish metal-work from the axes and swords of the bronze age, about 2000 B.C., down to the choice silversmiths' work of the seventeenth and eighteenth centuries. A large collection of reproductions from the most valuable and beautiful of the specimens of Celtic ornament in the National Museum was lent by Messrs Edmond Johnson. A feature of historic and artistic interest in this section is the collection of some 300 Irish engraved portraits and landscapes, including several examples of great rarity, which were collected, and furnished with a valuable catalogue, by Mr. W. G. Strickland, assistant curator of the National Gallery, Dublin.

As a result of the recent annual examination for Scholarships in Agriculture, tenable at the Royal College of

**Agricultural Science, Dublin.** the following candidates  
**Scholarships, 1904.** have been awarded Scholarships:—Edward S. Daly, Albert Agricultural College, Glasnevin, Dublin; Laing J. Fairbairn, Banteer, Co. Cork; John Lucey, Killinardrish, Co. Cork; Patrick M'Ginnis, Carrickhue, Co. Londonderry; John Scully, Albert Agricultural College, Glasnevin, Dublin; William A. Talbot, Albert Agricultural College, Glasnevin, Dublin; Thomas Ward, Albert Agricultural College, Glasnevin, Dublin.

Each Scholarship entitles the holder to free admission to the first year's course of instruction at the College, a maintenance allowance

of one guinea per week while in attendance at the College, and third-class railway fare for one journey to and from the College in each session.

A Scholarship is tenable for one year, but if satisfactory progress is made by the holder it will be renewed for a second, and even for a third year, to enable the student to complete the agricultural course at the College.

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The Departmental Committee appointed by the Board of Agriculture and Fisheries to investigate experi-

**The Dipping and Treatment of Sheep.** mentally and to inquire into certain questions connected with the dipping and treatment of sheep has issued its report.\*

The object of the enquiry was to ascertain and report upon:—

(1.) The composition and essential constituents of efficient dips and other preparations for the treatment and dressing of sheep, and their effect upon the animal treated or dressed, and upon the parasites and other organisms for the destruction of which they are used;

(2.) The methods in which such dips and other preparations should be employed, and the appliances and facilities requisite for the purpose;

(3.) The times and intervals at which sheep should be treated or dressed, regard being had (a) to the life history and characteristics of the sheep-scab acarus and of the other parasites and organisms of sheep which require external treatment, and (b) to the practical conditions under which sheep farming is carried on in various parts of the United Kingdom.

With regard to the dipping of sheep, the Committee declare that as its advisability is generally recognised, they do not "think it necessary to labour this material point in detail; it is sufficient to state that sheep dipping is now thoroughly recognised as a necessity, and that all the most experienced sheep breeders are strongly of opinion that dipping, not only on one but often on two or three occasions during the year, is most beneficial, for the prevention of Sheep-scab, the destruction of parasites, and for the general health of sheep." The Committee also emphatically approve of the principles of the Act of Parliament, passed last year, enabling the Board of Agriculture and Fisheries in Great Britain

and the Department of Agriculture and Technical Instruction for Ireland to make orders for the compulsory dipping of sheep. During the inquiry thirty-one witnesses were examined, the greater number representing those interested in sheep farming in the United Kingdom and other countries. Two of the witnesses, experts in Economic Zoology, were examined at some length on the life-histories of the various parasites which attack sheep.

By permission of the Agricultural Department of the University College of North Wales, three sets of experiments were conducted at Bangor with a large number of sheep-dips of representative types, and by the courtesy of the officials of the Bradford Conditioning House the effect of these dips upon the condition, colour, and fibre of the wool was tested.

The majority of the Committee was in favour of the dipping of sheep being made compulsory, and the Report recommends that local authorities should provide portable dipping appliances and, where desired, fixed public dipping tanks. Two members of the Committee—Mr. M. Hedley (Chief Veterinary Inspector of the Department of Agriculture and Technical Instruction for Ireland) and Sir Henry Hull Scott, were unable to agree with all the recommendations of their colleagues, and make independent recommendations, which are printed with the Report.

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The complete agricultural returns for both Great Britain\* and Ireland† for the year 1903 have been recently published, and they present several interesting points of comparison. The total number of acres under crops and grass in Great Britain is in round numbers 32,000,000, whilst the acreage in Ireland similarly utilised is rather less than half this, viz., 15,000,000 acres. Over twenty-two per cent. of the cultivated land in Great Britain is under corn crops, whilst the corresponding percentage in Ireland is less than nine. Nearly 77 per cent. of the total area under corn crops in Ireland is devoted to oats, whilst less than 45 per cent. of the corn land of Great Britain is devoted to that crop. In Ireland just over 1,000,000 acres are under green crops, of which nearly two-thirds are given up to potatoes, but in Great Britain, though the area under potatoes is

\* Cd. 2181.—1904.

† Cd. 2196.—1904.

about 60,000 acres less, the total acreage under green crops is nearly three times as great as in Ireland. Almost 22,000,000 acres, or two-thirds of the agricultural land, are under grass in Great Britain, whilst of the corresponding total area in this country about six-sevenths, or nearly 13,000,000 acres, are under grass. The comparatively much greater prevalence of grazing in Ireland is shown by the fact whilst about 45 per cent. of the total agricultural area in Great Britain is given up to grass not grown for hay, over 70 per cent. of the corresponding area in Ireland is similarly used.

The following table shows the number of live stock:—

	Great Britain.	Ireland.
Horses, . . .	1,537,154	523,822
Cattle, . . .	6,704,618	4,664,112
Sheep, . . .	25,639,797	3,944,604
Pigs, . . .	2,686,561	1,383,516

As regards the rate of produce, the yield of corn crops per acre is considerably heavier in Ireland than in England. Thus, whilst wheat gave 30 bushels to the acre in Great Britain the same crop produced 31 bushels in Ireland. In Great Britain barley averaged 32 bushels, in Ireland 36½ bushels. Again, whilst oats only produced 39½ bushels in Great Britain, they yielded almost 44 bushels in Ireland. As regards green crops, however, Great Britain was the more successful. The average yield per acre in Great Britain was—for potatoes, about 5 tons, in Ireland rather more than 3½ tons; for turnips and swedes the average was about the same in both countries; for mangolds Great Britain produced nearly 18 tons, as contrasted with Ireland's 13½ tons. As regards hay of all kinds, however, Ireland produced 47 cwts. per acre, against Great Britain's 27 cwts. per acre. No doubt the figures relating to the yield of one or two of the corn crops are unduly flattering to the richness of Irish land since the area under cultivation is too small to furnish any indication of the general fertility of the soil, especially as these crops are grown for the most part in certain particularly favourable districts, but still there seems little room for doubt as to the great fertility of considerable areas of Irish land.

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In the report on the Agricultural Statistics of Great Britain,\* for the year 1903, there is an interesting note on the importation of agricultural produce into the United Kingdom.

**Agricultural Imports  
into the United  
Kingdom.**

Some idea of the enormous quantity of meat imported, and of the changes in the sources of supplies, may be obtained from the following table, which shows the amount of beef received (alive or dead) from the chief exporting countries during the five years 1899-1903:—

YEAR.	From Argentina.		From Canada.		From the United States.	
	As Live Cattle.	As Dead Meat.	As Live Cattle.	As Dead Meat.	As Live Cattle.	As Dead Meat.
	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>
1899	26,000	8,000	29,000	5,000	102,000	156,000
1900	12,000	22,000	32,000	3,000	118,000	167,000
1901	—	40,000	27,000	2,000	135,000	185,000
1902	—	49,000	29,000	2,000	108,000	141,000
1903	9,000	61,000	59,000	2,000	100,000	157,000

Of the various kinds of dead meat, the amount of beef imported in 1903 was greater than in the previous year. Imports of fresh mutton were heavier by 18,000 tons than in the previous year—hitherto the highest recorded—and it may be pointed out that the total amount now for the first time exceeds 200,000 tons. The quantity of pig-meat received has declined for some years past, and this appears to be attributable in the main to the reduced import of hams, of which we received in 1903 but little more than half the amount of five years ago.

Of provisions, there were imported over 200,000 tons of butter in 1903, the highest aggregate receipts on record.

**Dairy Produce.** It may be noted that as much as 55 tons are this year credited to Iceland or Greenland, while Uruguay appears in the list of butter-exporting countries with over 28 tons. The imports of margarine, which after a notable decline had shown some recrudescence in the past few years, fell off very markedly, and our total receipts (44,000 tons) were the smallest entered since this commodity was separately distinguished in the Trade Returns. Cheese imports slightly increased; but the quantity of milk, whether fresh or condensed, was practically identical with that recorded in the previous year. The supplies of eggs were again larger, Russia still further increasing her pre-eminence as an exporter, and contributing more than a third of the total importation into this country.

**Eggs.**

The chief item calling for notice in the importation of cereals is the remarkable increase in the imports of **Wheat and Flour.** wheat, which distinguished the calendar year 1903. The total received in the form of grain alone amounted to as much as 4,407,000 tons. This is 356,000 tons more than in 1902, and nearly one-third greater than the average supply of wheat in grain for the previous decade. The amount of wheat-flour, although rather above the figures of 1902, was slightly less than in some of the immediately preceding years. The aggregate of wheat and flour, (the latter being estimated at its equivalent weight in grain) amounted, nevertheless, to 5,837,000 tons in the past calendar year—a figure which is 441,000 tons more than has been received on the shores of the United Kingdom on any previous occasion.

The relative proportions of the supplies of breadstuffs received from British Possessions, as well as their striking fluctuations in recent years, may be again conveniently shown as follows:—

YEAR .	India.	Canada.	Anstralla.	New Zealand.	All British Possessions.
	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>
1899	410,000	436,000	151,000	35,000	1,032,000
1900	—	400,000	146,000	57,000	606,000
1901	167,000	429,000	310,000	69,000	975,000
1902	442,000	611,000	241,000	8,000	1,272,000
1903	853,000	723,000	—	—	1,578,000

The still larger totals of the sea-borne supplies of wheat and flour, which have been derived from Foreign Countries, are similarly analysed as regards their varying origin in the same years in the following summary:—

YEARS.	United States.	Argentina.	Russia.	Austria-Hungary.	Other Foreign Countries.	Total Foreign.
	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>
1899	3,011,000	576,000	126,000	72,000	108,000	3,893,000
1900	2,871,000	938,000	225,000	81,000	212,000	4,327,000
1901	3,348,000	415,000	129,000	56,000	135,000	4,078,000
1902	3,948,000	227,000	331,000	48,000	270,000	4,124,000
1903	2,337,000	712,000	864,000	57,000	280,000	4,250,000

These figures enforce the lesson of the extent to which the variability of harvest conditions must change

### Wheat and Flour.

(Continued.)

from year to year the sources of our wheat supply, and the difference in this respect is even more notable than usual, comparing 1903 with 1902. The United States, which sent upwards of 3,200,000 tons of wheat (in grain or flour) in 1902, furnished us with only 2,336,000 tons last year; while the Australian contribution dropped from 211,000 tons to the practically negligible amount of 3 tons. On the other hand, Argentina furnished 712,000 tons to this country, as compared with only 227,000 tons in 1902; and our Indian possessions nearly doubled their exports to us. The 853,000 tons received from this quarter, indeed, far exceeded the large totals imported nearly twenty years ago, when Indian wheat supplies were being anxiously watched by our producers for their effect on the prices here. The Canadian quota was also again increased, although not in the same ratio as in 1902. It may be of interest to show here the proportional variations in the origin of our supplies of wheat and flour (expressed as grain), the amount from the principal countries being given as a percentage of the total imports.

COUNTRY.	1899.	1900.	1901.	1902.	1903.
	%	%	%	%	%
Argentina, ... ..	11.7	19.0	8.2	4.2	12.2
Roumania, ... ..	0.0	0.8	0.5	2.2	2.7
Russia, ... ..	2.5	4.6	2.5	6.1	14.8
United States, Atlantic, ...	54.1	47.3	57.1	48.1	34.9
" " Pacific, ...	7.1	10.0	9.1	12.1	5.1
Other Foreign Countries, ...	3.6	5.1	3.3	3.7	3.3
Total Foreign Countries, ...	79.0	87.7	80.7	76.4	73.0
Australia, ... ..	3.1	3.0	6.1	3.9	0.0
Canada, ... ..	8.9	8.1	8.5	11.3	12.4
British East Indies, ...	8.3	0.0	3.3	8.2	14.6
Other British Possessions, ...	0.7	1.2	1.4	0.2	0.0
Total British Possessions, ...	21.0	12.3	19.3	23.6	27.0
TOTAL, ... ..	100.0	100.0	100.0	100.0	100.0

Under the other groups of cereal imports it may be noted that in 1903 there was a further slight increase

**Barley.** on the relatively large total of barley imported in 1902. Only a small proportion of this cereal (25,000 tons) was drawn from British Possessions, and it may be noticed that of this amount as much as seven-tenths came from Cyprus. The changes in the imports of maize, if examined in detail, are perhaps even more striking

**Maize.** than those of wheat. Owing to the extreme shortness of the crop of 1901 in the United States, the imports from that country in 1902 amounted to less than 100,000 tons. In 1903 a recovery to 934,000 tons is recorded, but even this amount was only half the quantity from the same source in 1899 and 1900. Canada sent 169,000 tons as compared with 5,000 tons in the previous year: the Roumanian supply dropped from 930,000 tons to 212,000 tons, and the Russian from 330,000 tons to 178,000 tons. On the other hand the relatively heavy Argentine shipments of 1902 were still further augmented last year, with the result that the contribution from that country in 1903, viz., 936,000 tons, just exceeded that from the United States, so that Argentina ranked for the first time as the chief source of our supply of maize. With all these changes of origin, however, the total amount of maize received was but little more than 10 per cent. above the figures for 1902.

The imports of fruit in 1903 were very heavy, as a result, doubtless, of the great shortness of the home crop.

**Fruit.** Owing to the change in registration of the arrivals, under which the entries of raw fruit have been recorded in cwts. instead of bushels since 1899, it is not possible to compare with more than the three preceding years; but it may be noted that the imports of apples (4,570,000 cwts.) were over 60 per cent. heavier than in the preceding year, and probably represent the largest quantity ever received. Large quantities of potatoes and onions are also to be remarked as appearing in this section of the appended tables among the vegetable imports of the year.



A return showing the values of agricultural products exported during the years 1890, 1895, 1900, 1903, Values of Agricultural from Great Britain and Continental Countries Exports from Great Britain and Board of Trade. The most noteworthy Continental Countries. figures are those showing the values per head of the population of the chief exports (a) meat and live stock, (b) dairy produce, and (c) eggs from Denmark, during 1903, which were, respectively, 46s. 1d., 67s. 3d., and 12s. 2d. The next highest figure corresponding to any of these three classes of commodities was 2s. 2d., the value per head of the population of the meat and live stock exported from Austria-Hungary.

The most significant changes in the values of the exports will be seen from the following table:—

#### INCREASED EXPORTS.

COUNTRY.	Produce.	Value in Pounds (000 omitted).		Total Increase in Pounds (000 omitted).	Increase per head of Popula- tion.
		1890.	1903.		
France. ... ..	Potatoes, ... ..	363	869	506	s. d. 0 3
Germany, ... ..	do., ... ..	213	751	538	0 2
Do., ... ..	Grain (wheat, barley, oats, and rye.	74	3,046	2,972	0 11½
Austria-Hungary,	Eggs, ... ..	1,348	4,464	3,116	1 3
Italy, ... ..	Dairy Produce, ...	676	1,659	983	0 6½
Russia, ... ..	Do., ... ..	371	3,395	3,024	0 5
Do., ... ..	Eggs, ... ..	1,236	5,383	4,147	0 6½
Denmark, ... ..	Meat and Live Stock,	3,317	5,783	2,466	15 6
Do., ... ..	Dairy Produce, ...	4,314	8,449	4,135	27 6
Do., ... ..	Eggs, ... ..	375	1,524	1,149	8 9

#### DECREASED EXPORTS.

COUNTRY.	Produce.	Value in Pounds (000 omitted).		Total Decrease in Pounds (000 omitted).	Decrease per head of Popula- tion.
		1890.	1903.		
France, ... ..	Eggs, ... ..	1,089	515	574	s. d. 0 3¼
Germany, ... ..	Meat and Live Stock,	1,971	1,008	963	0 5½

**The Thirteenth Annual Report\*** of the Congested Districts Board for Ireland has just been issued. As usual,

**Report of the** it is replete with interest and information.  
**Congested Districts** The operations of the Board are classified  
**Board.** under the following headings:—Agriculture, Improvement of Holdings and Migration, Sea Fisheries, Industries, Engineering Works, and Parish Committees and Miscellaneous.

In all these spheres of activity much excellent work has been done—the success of the Parish Committees being particularly gratifying. It will be remembered that the aim of the scheme of Parish Committees is the encouragement, by means of prizes or small grants-in-aid, of useful and permanent improvements in the people's dwellings, holdings, and general surroundings. The results of the operations of the Parish Committees have been in most cases very satisfactory, so much so that the Scheme has been extended to additional parishes, and the grants increased from £3,680 to 39 parishes in 1902–3 to £6,723 to 104 parishes in 1903–4.

The improvements effected in some parishes through the operations of the scheme are most striking and encouraging. In many townlands in the Swinford Union, where twelve or fifteen years ago few dwelling-houses were to be found in which cattle were not kept, there are now very few dwellings in which cattle are kept. Everywhere one sees small out-offices roofed with corrugated iron, put up by the people themselves under the Parish Committee Scheme.

The grants-in-aid given by the Committees represent only a small proportion of the cost of the erection of the buildings, yet the competition for the grants is usually keen amongst those who have cattle in their dwellings, except in the case of those who are very poor, have helpless families and are not able to undertake the erection of out-offices even with the aid of the maximum grant.

A report† on the special Technical Schools for the Ceramic industries in Germany has just been issued

**German Schools for** by the Foreign Office. The report, which  
**Ceramic Industries.** has been prepared by Dr. Frederic Rose, His Majesty's Consul at Stuttgart, states that

there are four of these institutions in Germany, situated at Höhr, Bunzlau, and Lauban in Prussia, and at Landshut in Bavaria.

\* Cd. 2275.—1904.

† Diplomatic and Consular Reports—Miscellaneous Series, No. 615.

All four schools are situated in the midst of the industries they are intended to promote. Their aim is to afford a thorough combined theoretical and practical workshop instruction, and to train young persons for future positions as owners, managers, foremen, painters and modellers in the various branches of the ceramic industries.

The present report is devoted to an exposition of the organisation, methods and details of the instruction at these schools, with some remarks upon their relations to the industries which they are intended to promote.

Among the interesting facts which Dr. Rose points out, two call for special attention. First, that in Prussia, when a technical school is considered necessary, the State promises an annual subsidy, provided that the local authorities erect the necessary buildings. Secondly, that manufacturers, though at the outset indifferent or hostile, soon recognised the value of such institutions.

His Majesty's Consul-General at Frankfurt-on-Main reports\* that among the agrarian endeavours to raise the **Agricultural Unions**. farmers' revenues generally, and the prices of grain in particular, must be reckoned the foundation of agricultural unions; and it must be admitted that, generally speaking, these agricultural societies in Germany are flourishing. Some among them at least have rendered good services, such as the "Einkauf-und Credit-Genossenschaft," and "the central office for the traffic of spirit" (Centrale für Spiritus Verwerthung), which have succeeded in considerably raising the prices. The Sugar Ring, too, had fulfilled its purpose, until the change of legislation robbed it of all importance. On the other hand, those unions which endeavoured to oust the middleman, and which were intended to secure to the farmers the middleman's commissions, have so far not been followed by the success which was expected from them.

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With the exception of the years 1898 and 1899, the Spring mackerel catch of 1904 was well up to the average of the past dozen years. Prices, **Spring Mackerel Fishery, 1904**. however, ruled low, and the fishermen's receipts for the fish (about £65,000) fell short by some £25,000 of those for the Spring of 1903. This decline was due in some measure to the depression caused by the

\* Foreign Office Reports; Annual Series, No. 3221.

threatened increase of the American import duty on Irish pickled mackerel from which the trade is now happily free. An immediate result of the threatened increase was a reduction in the amount cured for export from 10,400 barrels in 1893, to 3,000 in 1904.

The landings on the south coast, from Kinsale to Baltimore—and also at Valentia—were better this year than last, while at all other important centres the take was smaller. At Berehaven, which from its position ought to be, and occasionally has been, the best centre for the Spring fishing, on the whole Irish coast, there was a serious falling off. The want of railway transit facilities is felt here. The few large buyers who visit the place come from England, and provide their own steamer transport, and now that the engaged boat system has largely gone out of use competition in buying there is perhaps less relied on by fishermen than at places where good railway facilities not only lead to the presence of outside buyers, but afford inducement to local firms to engage in the trade.

The weather was bad at the opening of the season.

It has been the aim of the Department to induce fishermen to move about more, and to visit parts of the coast where better fishing, at that particular season, can be expected than near their own homes. In charge of a skilled Arklow instructor, an Antrim crew was induced to bring its boat to the Galway coast for the Spring mackerel fishing, but it is to be regretted that this first venture did not meet with the hoped for success.

The summer herring capture of 1904 has proved nearly twice as great as that of 1903, but the cash value has only been £43,724, as against £30,437. The increase in quantity was fairly general. For example, the take at Dunmore East, on the south coast, rose from 12,088 cwts. in 1903 to 28,856 cwts. in 1904; again at Downing's Bay (Sheephaven) on the north coast, the increase was from 9,303 cwts to 22,858 cwts. In both of these places the bulk of the fish was taken by Scotch boats; but in Donegal local crews are taking part in the industry, and during the past Spring sixteen local first or second class boats followed it. The Tory Islanders, too, in their open yawls, reaped a rich harvest. At this period of the year the greater number of Irish first-class boats are engaged in the mackerel fishery; while for the Scotchmen

**Summer Herring  
Fishing, 1904.**

who are fitted out for herring fishing only the season on the Irish coast comes in opportunely at a time when they have no better employment in their own waters.

At Howth, where the Spring herring fishery begins later than in the districts already named, fifty-three Irish boats assembled, together with others from Cornwall and Scotland, and carried on a fishing which resulted in a total capture more than double that of 1903. Its value was over £4,000.

On the Donegal coast, at Cleggan, and in the Aran Islands (Co. Galway) almost all the catch was cured for export; but at other ports the great bulk of the herrings was sent *fresh* to market. At Burton Port all the herrings taken, viz., 1,070 cwts., were kippered.

Where curing is going on, the local girls are quickly learning the trade and rendering it less necessary for the curers to import female labour. So adept, indeed, do these girls become that Scotch merchants took a number of them to their stations in Scotland after last season on the Irish coast. The wages that the girls earn vary with the catch, but on some occasions, when heavy takes had been landed, girls made up to 10s. in the day.

The second of these competitions\* took place on the 22nd June.

Exhibits were received from 104 creameries.

**Surprise Butter** The judges were four in number, consisting  
**Competitions, 1904.** of representative butter merchants of  
 Limerick, Liverpool, Glasgow, and Reading.

On the recommendation of the judges prizes were awarded to the undermentioned competitors:—Piltown Co-operative Agricultural and Dairy Society; Granagh Co-operative Dairy Society; Scottish Co-operative Wholesale Society, Enniskillen; Urney Co-operative Agricultural and Dairy Society; Ballymacelligott Co-operative Dairy Society; Derrygonnelly Co-operative Dairy Society; Cavan Creameries, Ltd.; Knockvicar Co-operative Agricultural and Dairy Society; Anglo-Irish Condensed Milk Co., Ltd.; Ballinahinch (Co-operative Wholesale Society) Creamery; North Cappagh Co-operative Agricultural and Dairy Society; Solohead Co-operative Agricultural and Dairy Society; Muckalee Co-operative Dairy Society; Old Mill Creamery (Proprietary); Whitecross Co-operative Agricultural and Dairy Society.

\* See *Journal*, Vol. IV., No. 4, pp. 738 and 760.

The third competition took place on the 7th July. Exhibits were received from 101 creameries. The judges were four in number, consisting of representative butter merchants of Cork, Edinburgh, London, and Manchester. On the recommendation of the judges prizes were awarded to the undermentioned competitors:—Solohead Co-operative Agricultural and Dairy Society; Drumquin Creamery (Proprietary); Effin Co-operative Agricultural and Dairy Society; Finn Valley Co-operative Agricultural and Dairy Society; Belleek Co-operative Agricultural and Dairy Society; Doons Co-operative Agricultural and Dairy Society; Ardagh Co-operative Dairy Society; Ballinamore Co-operative Agricultural and Dairy Society; Dromclough Co-operative Wholesale Society; Donegal Co-operative Agricultural and Dairy Society; Boherbue Co-operative Wholesale Society; Cutteen Co-operative Wholesale Society; Leckpatrick Co-operative Agricultural and Dairy Society; Anglo-Irish Condensed Milk Co., Ltd.; Fivemiletown and Brookeborough Co-operative Agricultural and Dairy Society; Grangemockler Co-operative Dairy Society; Piltown Co-operative Agricultural and Dairy Society; Scottish Co-operative Wholesale Society (Enniskillen).

The fourth competition took place on the 24th August. Exhibits were received from 100 creameries. The judges were four in number, consisting of representative butter merchants of Belfast, Glasgow, London, and Manchester. On the recommendation of the judges prizes were awarded to the undermentioned competitors:—Longford Co-operative Agricultural and Dairy Society; Finn Valley Co-operative Agricultural and Dairy Society; Granagh Co-operative Dairy Society; Doons Co-operative Agricultural and Dairy Society; Kilmallock Creamery Co.; Killyman Co-operative Agricultural and Dairy Society; Scottish Co-operative Wholesale Society, Enniskillen; Belleek Co-operative Agricultural and Dairy Society; Omagh Co-operative Agricultural and Dairy Society; Drumquin Creamery; Knockvicar Co-operative Agricultural and Dairy Society; Moneymore Co-operative Agricultural and Dairy Society; Fivemiletown and Brookeborough Co-operative Agricultural and Dairy Society; Howardstown Dairy Co.; Kiltoghert Co-operative Agricultural and Dairy Society; Piltown Co-operative Agricultural and Dairy Society; Springfield Co-operative Agricultural and Dairy Society; Dromore Co-operative Agricultural and Dairy Society; North Cappagh Co-operative Agricultural and Dairy Society.

The fifth competition took place on the 22nd September. Exhibits were received from ninety-nine creameries. The judges

were five in number, consisting of representative butter merchants of Birmingham, Cork, Glasgow, Liverpool, and Manchester. On the recommendation of the judges, prizes were awarded to the undermentioned competitors:—Urney Co-operative Agricultural and Dairy Society; Finn Valley Co-operative Agricultural and Dairy Society; Omagh Co-operative Agricultural and Dairy Society; Ballyrashane Co-operative Agricultural and Dairy Society; Kiltoghert Co-operative Agricultural and Dairy Society; Granagh Co-operative Dairy Society; Dromore Co-operative Agricultural and Dairy Society; Greenane Co-operative Wholesale Society; Limavady Co-operative Agricultural and Dairy Society; Old Mill Creamery (Proprietary); Inver Co-operative Agricultural and Dairy Society; Grantstown Co-operative Wholesale Society.

## STATISTICAL TABLES.



## FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast.				East Coast.			
	1904.		1903.		1904.		1903.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	1	3	.	.	32	136	39	73
Soles, . . . . .	15	98	69	114	49	284	90	529
Turbot, . . . . .	1	4	5	15	21	132	25	149
Total Prime Fish, . . . . .	17	103	74	129	102	552	154	751
Cod, . . . . .	196	52	104	15	540	516	629	609
Conger Eel, . . . . .	.	.	.	.	595	291	621	329
Haddock, . . . . .	243	104	332	147	381	465	583	516
Hake, . . . . .	.	.	.	.	645	633	1,262	906
Herrings, . . . . .	26,635	8,896	11,130	9,987	12,250	1,068	253	119
Ling, . . . . .	.	.	.	.	352	171	266	124
Mackerel, . . . . .	430	49	2,603	859	.	.	.	.
Plaice, . . . . .	808	705	679	602	1,022	1,110	1,002	902
Ray or Skate, . . . . .	182	58	192	63	846	207	630	174
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	.	.	.	.	1,130	726	798	540
All other except Shell Fish, . . . . .	181	40	226	86	1,660	508	1,182	567
Total, . . . . .	28,692	10,007	15,340	11,883	9,533	6,247	7,370	5,537
SHELL FISH :—	No.		No.		No.		No.	
Crabs, . . . . .	2,748	20	552	6	14,164	81	5,291	60
Lobsters, . . . . .	784	24	799	28	6,474	274	10,010	462
Mussels, . . . . .	Cwts.	.	Cwts.	.	Cwts.	332	Cwts.	480
Oysters, . . . . .	No.	.	No.	.	No.	.	No.	.
Other Shell Fish, . . . . .	Cwts.	.	Cwts.	144	Cwts.	516	Cwts.	546
Total, . . . . .	.	44	.	43	.	532	.	680
Total Value of Fish landed, . . . . .	.	10,051	.	11,931	.	6,779	.	6,217

NOTE—The above figures are subject to

## IRELAND.

as landed on the IRISH COASTS during the month of May, 1904, as corresponding period in 1903.

South Coast.				West Coast.				Total.			
1904.		1903.		1904.		1903.		1904.		1903.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
.	.	3	6	17	24	14	15	50	163	56	94
31	126	28	132	362	1,636	460	1,810	457	2,142	647	2,585
3	12	5	15	33	109	42	143	58	257	77	322
34	138	36	153	412	1,769	516	1,968	565	2,562	780	3,001
557	335	40	34	544	106	155	69	1,837	1,069	928	727
109	71	54	27	27	13	50	16	731	375	725	372
96	53	20	14	301	126	73	40	1,021	748	1,008	717
.	.	.	.	12	5	26	12	657	838	1,238	918
21,105	5,901	12,898	3,479	8,166	2,049	19	9	58,166	17,914	24,300	13,594
647	429	318	278	228	86	111	47	1,227	886	685	449
101,087	17,454	53,235	19,764	46,680	13,131	54,951	17,510	148,197	30,634	110,789	38,133
190	177	168	154	206	160	341	250	2,226	2,152	2,190	1,908
118	11	46	5	28	8	56	14	1,174	284	924	256
.	.	.	.	.	.	1	1	.	.	1	1
90	20	39	12	480	174	727	297	1,700	940	1,564	849
172	85	136	68	1,082	151	1,132	298	3,495	784	2,736	1,019
124,205	24,674	66,900	23,958	55,166	17,838	58,218	20,531	229,596	58,766	147,918	61,944
No. 122	1	No. 231	2	No. 271	2	No. .	.	No. 17,305	104	No. 6,074	68
1,280	39	851	31	2,524	88	2,953	90	11,062	425	14,613	611
Cwts. .	.	Cwts. .	.	Cwts. .	.	Cwts. .	.	Cwts. 332	9	Cwts. 480	12
No. .	.	No. .	.	No. .	.	No. .	.	No. .	.	No. .	.
Cwts. 190	10	Cwts. 180	18	Cwts. 873	154	Cwts. 918	162	Cwts. 1,579	341	Cwts. 1,788	335
.	59	.	51	.	244	.	252	.	879	.	1,426
.	24,738	.	24,039	.	18,082	.	20,783	.	59,645	.	62,470

correction in the Annual Returns.

## FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast.				East Coast.			
	1904.		1903.		1904.		1903.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	.	.	86	128	50	141
Soles, . . . . .	15	84	11	39	68	357	215	540
Turbot, . . . . .	2	2	1	5	8	51	47	215
Total Prime Fish, . . . . .	17	86	12	44	112	536	312	896
Cod, . . . . .	20	16	20	3	531	475	907	540
Conger Eel, . . . . .	.	.	.	.	568	261	510	285
Maddock, . . . . .	185	48	404	97	948	906	514	606
Hake, . . . . .	.	.	.	.	976	1,004	1,090	825
Herrings, . . . . .	5,763	4,061	525	583	10,843	4,014	8,856	4,562
Ling, . . . . .	.	.	.	.	235	98	185	110
Mackerel, . . . . .	312	23	.	.	.	.	.	.
Plaice, . . . . .	709	562	530	373	640	829	1,205	951
Ray or Skate, . . . . .	160	44	50	17	481	130	672	175
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	.	.	.	.	858	474	779	481
All other except Shell Fish, . . . . .	190	48	169	41	1,887	789	1,663	695
Total, . . . . .	7,356	4,888	1,710	1,158	18,079	9,516	16,683	10,116
SHELL FISH:—	No.		No.		No.		No.	
Crabs, . . . . .	3,229	15	3,960	10	17,088	87	10,984	91
Lobsters, . . . . .	3,178	109	2,911	79	6,577	273	10,239	464
Mussels, . . . . .	Cwts. 1,540	10	Cwts. .	.	Cwts. 270	10	Cwts. 280	7
Oysters, . . . . .	No. .	.	No. .	.	No. .	.	No. .	.
Other Shell Fish, . . . . .	Cwts. .	.	Cwts. .	.	Cwts. 360	125	Cwts. 510	149
Total, . . . . .	.	134	.	89	.	495	.	711
Total Value of Fish landed, . . . . .	.	5,022	.	1,247	.	10,011	.	10,827

NOTE.—The above figures are subject to

## IRELAND.

as landed on the IRISH COASTS during the month of June, 1904, as corresponding period in 1903.

South Coast.				West Coast.				Total.			
1904.		1903.		1904.		1903.		1904.		1903.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
.	.	.	.	66	109	61	88	102	237	111	229
27	128	20	79	182	658	484	1,339	292	1,227	730	1,997
2	6	2	6	75	232	75	232	87	291	125	458
29	134	22	85	323	999	620	1,650	481	1,755	966	2,684
139	85	64	43	107	35	35	15	797	611	1,026	601
152	87	31	17	7	3	7	3	727	351	548	305
59	36	24	12	225	107	86	59	1,417	1,097	1,028	774
11	16	57	42	30	13	66	25	1,017	1,033	1,213	892
15,347	5,695	4,381	1,815	1,154	329	28	15	33,107	14,099	13,790	6,965
193	110	86	56	49	18	31	13	477	226	301	179
41,662	7,069	41,923	14,378	38,167	7,309	53,083	13,397	80,141	14,401	95,006	27,775
149	146	121	129	471	315	505	375	1,969	1,852	2,364	1,823
86	11	17	3	27	6	55	8	754	191	794	203
.	.	.	.	.	.	.	.	.	.	.	.
103	36	123	67	332	136	491	220	1,293	646	1,393	768
410	135	221	130	1,173	403	963	440	3,660	1,375	3,016	1,306
58,340	13,560	47,072	16,777	42,065	9,673	55,970	16,229	125,840	37,637	121,445	44,280
No.		No.		No.		No.		No.		No.	
793	6	1,760	13	560	4	74	1	21,670	112	16,778	115
7,498	261	6,958	226	5,402	155	6,867	235	22,715	798	27,005	1,004
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
285	3	.	.	.	.	.	.	2,095	23	260	7
No.		No.		No.		No.		No.		No.	
.	.	.	.	.	.	.	.	.	.	.	.
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
160	16	190	19	770	130	770	137	1,290	271	1,470	305
.	286	.	258	.	289	.	373	.	1,204	.	1,431
.	13,846	.	17,035	.	9,962	.	16,602	.	38,841	.	45,711

correction in the Annual Returns.

## FISHERY STATISTICS—

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as compared with the

	North Coast.				East Coast.			
	1904.		1903.		1904.		1903.	
	Quantity.	Value.	Quantity.	Value	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	.	.	22	94	38	74
Soles, . . . . .	9	58	20	71	67	506	193	484
Turbot, . . . . .	.	.	1	3	17	89	21	102
Total Prime Fish, . . .	9	58	21	74	106	689	255	660
Cod, . . . . .	.	.	.	.	638	398	1,042	674
Conger Eel, . . . . .	.	.	.	.	410	183	619	312
Haddock, . . . . .	59	12	168	62	981	842	662	737
Hake, . . . . .	.	.	.	.	807	759	865	729
Herrings, . . . . .	.	.	.	.	15,860	6,946	12,251	5,854
Ling, . . . . .	.	.	.	.	188	78	309	177
Mackerel, . . . . .	31	8	.	.	145	48	45	8
Plaice, . . . . .	559	470	397	312	591	682	892	946
Ray or Skate, . . . . .	54	15	20	6	737	164	381	119
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	.	.	.	.	807	437	698	439
All other except Shell Fish, .	194	47	33	19	1,964	791	2,324	1,191
Total, . . . . .	906	610	639	463	23,234	12,017	20,403	11,846
SHELL FISH:	No.		No.		No.		No.	
Crabs, . . . . .	5,876	19	.	.	28,731	120	29,062	206
Lobsters, . . . . .	10,859	249	2,160	77	8,723	606	12,477	526
Mussels, . . . . .	Cwts.	.	Cwts.	5	Cwts.	2	Cwts.	.
	.	.	390	.	63	.	.	.
Oysters, . . . . .	No.	.	No.	.	No.	.	No.	.
	.	.	.	.	.	.	.	.
Other Shell Fish, . . . . .	Cwts.	.	Cwts.	9	Cwts.	129	Cwts.	256
	.	.	44	.	373	.	504	.
Total, . . . . .	.	288	.	91	.	757	.	987
Total Value of Fish landed, .	.	878	.	554	.	12,774	.	12,833

NOTE—The above figures are subject to

## IRELAND.

landed on the IRISH COASTS during the Month of July, 1904, as corresponding period in 1903.

South Coast.				West Coast.				Total.			
1904.		1903.		1904.		1903.		1904.		1903.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
14	7	1	2	52	73	53	77	88	174	92	153
35	162	33	133	151	454	191	616	262	1,180	437	1,304
2	8	3	3	55	184	57	184	74	281	85	297
61	177	37	143	258	711	301	877	424	1,635	614	1,754
18	10	43	36	23	11	17	7	679	419	1,102	717
35	13	23	7	28	7	2	1	473	203	644	320
.	.	.	.	90	60	183	82	1,130	914	1,013	871
7	6	215	174	259	182	122	46	1,073	947	1,202	949
95	42	526	198	131	78	291	183	16,086	7,066	13,068	6,240
9	6	32	18	18	8	3	1	215	92	404	196
14,155	2,326	12,286	3,801	7,298	1,579	3,813	1,783	21,629	3,961	16,144	5,592
207	249	170	162	692	529	567	462	2,049	1,390	2,026	1,882
.	.	5	1	23	5	31	6	814	184	437	132
70	7	143	22	45	7	.	.	115	14	143	22
168	65	132	53	331	123	848	291	1,306	625	1,678	783
1,588	1,377	1,076	419	1,399	454	1,450	508	5,145	2,669	4,883	2,137
16,403	4,278	14,688	5,034	10,595	3,754	7,628	4,252	51,133	20,659	43,358	21,595
No	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
2,954	19	2,072	15	1,184	11	1,336	19	33,745	169	32,470	239
11,096	324	21,703	416	13,697	378	11,089	341	44,375	1,457	47,429	1,360
Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
.	.	226	34	.	.	720	15	63	2	1,336	54
No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
.	.	.	.	.	.	.	.	.	.	.	.
Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
190	19	220	22	376	52	613	122	939	200	1,381	409
.	362	.	487	.	441	.	497	.	1,828	.	2,062
.	4,640	.	5,521	.	4,195	.	4,749	.	22,487	.	23,657

correction in the Annual Returns.

## SPRING MACKEREL

No.	Places where Fish are landed.	Collecting Stations	Date when Fishing may be said to have commenced.	Date when Fishing may be said to have ended.	Quantity captured.	Total approximate Value.	AVERAGE PRICES	
							March.	April.
1	Dunmore East.	Dunmore East,	—	—	Cwts. 8,151½	£ s. d. 435 12 4	£ s. d. —	£ s. d. —
2	Dungarvan, ...	Helvieck Head,	—	—	1,253	132 5 0	—	—
3	Ballycotton, ...	Ballycotton, ...	4th May, ...	28th June.	354	164 6 0	—	—
4	Queenstown,	Queenstown,	1st May, ...	30th June,	416	107 4 0	—	—
5	Kinsale, ...	Upper Cove, ...	26th March,	30th June,	46,637	12,100 6 6	2 0 0	1 10 0
6	Union Hall and Glandore.	Union Hall, ...	7th April,	30th June,	8,390	1,473 15 0	—	1 0 0
7	South Reen and Castletownsend.	Castletownsend,	12th April,	28th June,	626½	147 8 0	—	1 7 8
8	Baltimore, ...	Baltimore, ...	16th April	30th June,	43,962	10,761 3 6	—	1 5 0
9	Castletown Berehaven.	Castletown Berehaven.	14th April,	21st June	11,026	3,820 19 0	—	1 4 0
10	Garinish and Dursey.	Garinish and Dursey.	1st April, ...	20th May,	1,545½	579 19 0	}	1 8 0
	Transferia and Ballydonegan.	Ballydonegan,	1st April, ...	20th May,	349	115 1 0		to 0 8 0
11	Ballycrovane, Urban, and Travarra.	Ballycrovane,	30th April,	22nd June,	2,486	676 0 0	—	0 18 0
12	Rineen, Derrynane, Rathand West Cove.	Waterville, ...	1st April, ...	Middle of June.	1,800	787 10 0	—	1 10 0
13	Ballinskelligs, Boolakeel, Dungaggon, Allahe-nemore, Boat Cove and Horse Island.	Ballinskelligs, .	7th April,	19th May,	1,412	635 0 0	—	1 0 0
14	Portmagee, ...	Portmagee, ...	11th April,	27th June,	694	135 6 6	—	1 5 0
15	Knightstown and Renard Point.	Knightstown,	7th April,	30th June,	51,335	13,443 17 3	—	2 10 0
16	Cahiriveen, Coosroom, and Coonana.	Cahiriveen, ...	11th April,	May, ...	1,096	498 13 9	—	to 0 8 0
17	Dingle, ...	Dingle, ...	26th May,	30th June,	469	248 0 0	—	1 4 0
18	Dunquin, ...	Ventry, ...	8th April,	20th June,	833	312 0 0	—	—
19	Smerwick, Ferritor's Cove, Gortadoo, Ballinagaul, Dooneen, and Ballydavid.	Smerwick, ..	15th April,	14th June,	1,123½	370 10 0	—	1 0 0
20	Brandon Creek,	Brandon Creek,	15th March,	21st June,	1,327½	401 18 0	1 0 0	to 0 10 0
21	Brandon Bay...	Brandon Bay...	21st April,	21st June,	393	75 14 0	—	0 13 0
22	Fenit, ...	Fenit, ...	7th April,	22nd June,	26,472	8,209 7 6	—	0 10 0
23	Kilkee, ...	Kilkee, ...	20th May,	10th June,	1,081½	212 3 0	—	1 10 0
24	Kilronan, ...	North Arran, ...	26th April,	28th June,	10,554	2,768 6 7	—	—

FISHING, 1904. (TABLE No. 1.)

PER HUNDRED.		Number of Steamers carrying the Fish to England.	Number of Ice Hulks.	Number of Tons of Ice Imported.	Number of Barrels of Fish cured for Exportation.	Rate of Harbour Dues, &c.	Observations.	No.
May.	June.							
£ s. d.	£ s. d.							
—	—	—	—	—	—	—	Caught in Herring nets.	1
—	—	—	—	—	—	—	Do. do.	2
0 6 0	0 4 0	—	—	—	—	—	—	3
to	to	—	—	—	—	—	—	4
0 16 0	0 9 0	—	—	—	—	1s. 8d. per registered ton, and 1d. per ton deep water quay rate.	—	5
0 8 0	0 5 0	—	—	—	—	10s. and 6s. paid in advance.	—	6
0 11 0	0 8 0	5	2	2,645	640	—	—	7
0 13 0	0 6 6	—	—	—	1,100	—	—	8
0 10 6	0 5 0	—	—	—	58	—	—	9
1 5 0	0 18 0	5	3	1,200	200	10s. per annum, paid at end of season.	—	10
to	to	—	—	—	—	—	—	11
0 6 0	0 8 0	—	—	—	—	—	5½ cwts., value £2 8s., landed in January at Garinish and Dursley.	12
0 10 0	0 6 0	3	1	600	—	—	—	13
0 12 0	—	—	—	—	—	—	—	14
to	—	—	—	—	—	—	—	15
0 10 0	0 12 0	—	—	—	70	—	—	16
0 15 0	0 12 0	—	—	—	40	—	—	17
0 15 0	—	—	—	—	—	—	—	18
0 11 0	0 6 6	—	—	—	54	—	—	19
1 8 0	0 8 0	3	4	921	109	—	—	20
to	to	—	—	—	—	—	—	21
0 6 0	0 18 0	—	—	—	—	—	—	22
0 13 0	—	—	—	—	—	—	—	23
0 10 0	0 8 0	—	—	—	—	—	—	24
to	to	—	—	—	—	—	—	25
0 10 0	0 10 0	—	—	—	—	—	—	26
0 12 0	0 10 0	—	—	—	—	—	—	27
0 17 0	0 7 0	—	—	—	—	2s. per boat per annum.	22½ cwts., value £12 15s., landed in January	28
to	to	—	—	—	—	—	—	29
0 6 6	0 12 0	—	—	—	—	—	—	30
0 13 0	0 6 0	—	—	—	—	—	29 cwts., value £20 10s., landed in January.	31
0 6 0	0 7 0	—	—	—	60	—	—	32
0 11 0	0 11 0	2	3	1,188	—	10s. for sailing boats, 30s. for steam drifters— for season.	—	33
0 10 0	0 8 0	—	—	—	—	—	—	34
0 12 0	0 8 0	2	2	530	54	—	—	35



## SPRING MACKEREL

No.	Places where Fish are landed.	Collecting Stations.	Date when Fishing may be said to have commenced.	Date when Fishing may be said to have ended.	Quantity captured	Total approximate Value.	AVERAGE PRICES		
							March.	April.	
25	Roundstone, ...	Roundstone, ...	26th April,	28th June,	Cwts. 5,740	£ s. d. 1,722 0 0	—	£ s. d. 1 6 0	
26	Clifden, and Dunloughan.	Clifden, ...	25th April,	30th June,	670	135 0 0	—	to 0 14 0	
27	Bunowen, ...	Bunowen, ...	15th April,	20th June,	770	144 0 0	—	0 12 0	
28	Oleggan, Inish-bofin, and Inishark.	Oleggan, ...	16th April,	20th June,	11,757	2,928 13 6	—	1 2 6	
29	Blacksod, ...	Blacksod Point,	15th April,	11th June,	3,770	940 0 0	—	0 14 0	
30	Rathlacken, Kileummin Dock, and Rathfran.	Kileummin, ...	15th March.	30th June,	500	150 0 0	0 12 0	0 12 0	
31	Downies, ...	Mulroy, ...	—	—	483½	29 15 6	—	—	
32	Buncrana, ...	Buncrana ...	—	—	273½	43 1 0	—	—	
Total, ...					249,551½	64,704 15 11	—	—	

## SPRING MACKEREL FISHING, 1904. (TABLE No. II.)

Mackerel were also landed at the places set forth below, which are not included in the foregoing Return.

Collecting Station.		Places where landed.				Quantity.	Value.
						Cwts.	£ s. d.
Fethard, ...	...	Fethard, ...	...	...	...	½	0 7 6
Youghal, ...	...	Youghal, ...	...	...	...	112	23 5 0
Mill Cove, ...	...	Mill Cove, ...	...	...	...	2½	1 4 6
Bantry, ...	...	Bantry, ..	...	...	...	1	1 5 0
Kells, ...	...	Gleesk Cove, Rhodes and Kells Bay,	...	...	...	80	16 0 0
Kilcredane, ...	...	Carrigaholt, ...	...	...	...	30	10 0 0
Ross, ...	...	Ross, ...	...	...	...	41½*	9 2 0
Tullig, ...	...	Tullig, ...	...	...	...	18	2 5 0
Moveen Goleen, ...	...	Moveen Goleen, ...	...	...	...	6	0 15 0
Coosheen, ..	...	Farraly, ...	...	...	...	114½	17 5 6
Ballaghaline, ...	...	Ballaghaline, ...	...	...	...	80½	41 0
South Arran, ...	...	South Arran, ...	...	...	...	10½	5 5 0

\* 4 barrels cured for exportation.

FISHING, 1904. (TABLE No. I.)—*continued.*

PER HUNDRED.		Number of Steamers carrying the Fish to England.	Number of Ice Hulks.	Number of Tons of Ice Imported.	Number of Barrels of Fish cured for Exportation.	Rate of Harbour Dues, &c.	Observations.	No.
May.	June.							
£ s. d. 0 12 0	£ s. d. 0 7 0	—	1	220	130	—	—	25
0 10 0	0 5 0	—	—	1	92	—	—	26
0 10 0 to 0 5 0	0 5 0	—	—	—	110	—	—	27
0 10 0	0 6 6	—	1	500	256	—	4 cwts., value £2 17s., landed in January.	28
0 10 0	0 7 0	—	1	170	54	—	—	29
0 12 0	0 12 0	—	—	—	—	—	—	30
—	—	—	—	—	36	—	Caught in Herring nets,	31
—	—	—	—	—	—	1s. per boat each day it lands fish.	Do. do.	32
—	—	—	—	—	*3,023			

\* 4 barrels also cured at Ross—see Table II.

SPRING MACKEREL FISHING, 1904. (TABLE No. II.)—*continued.*

Mackerel were also landed at the places set forth below, which are not included in the foregoing Return.

Collecting Station.	Places where landed.	Quantity.	Value.
		Cwts.	£ s. d.
Rosmoney, ...	Westport, ... ..	243	66 5 0
Achilbeg, ...	Darby's Point, ... ..	243	60 15 0
Keel, ...	Keel, Doonagh, and Keem, ... ..	93	30 4 0
Belmullet, ...	Tip, ... ..	55½	16 15 9
Belderg, ..	Belderg, ... ..	30	7 10 0
Ballysiggart, ...	Ballysiggart, ... ..	90	32 0 0
Killybegs, ...	Killybegs, ... ..	3	1 1 0
Teelin, ...	Teelin, ... ..	11	3 10 0
Moville, ...	Moville, ... ..	70	17 10 0
Skerries, ...	Skerries, ... ..	½	0 2 6
	Totals, ... ..	1,336½	363 7 9

## SUMMER HERRING

No.	Coast Guard Station.	Ports or Creeks from which the Fishing was carried on.	Places at which the Boats discharged their Fish.	Date when Fishing may be said to have commenced.
1	Howth, . . .	Howth. . . . .	Howth, . . . . .	27th May, . .
2	Dunmore East, . .	Dunmore East, . . .	Dunmore East, . . .	19th April, . .
3	{ Ballinacourty, Helvick Head, }	{ Ballinagoul, . . . .	{ Dungarvan, . . . . .	{ 10th May, . .
4	Ballycottin, . . .	Ballycottin, . . . .	Ballycottin, . . . .	April, . . . .
5	East Ferry, . . .	Queenstown, . . . .	Queenstown, . . . .	12th April, . .
6	Upper Cove, . . .	Kinsale, . . . . .	Kinsale, . . . . .	7th June, . . .
7	Castletownbere, .	—	{ Bantry, . . . . . Castletownbere, . . }	{ 1st February . .
8	Knightstown, . .	—	Valentin, . . . . .	—
9	North Aran, . . .	Kilronan, . . . . .	Kilronan, . . . . .	1st February, . .
10	Cleggan, . . . .	—	Cleggan and Inishboffin, .	June, . . . . .
11	Teelin, . . . . .	Teelin, . . . . .	Teelin, . . . . .	1st April, . . .
12	Portnoo, . . . .	Rosbeg, . . . . .	Rosbeg, . . . . .	1st February, . .
13	Burtonport, . . .	Burtonport, . . . .	Burtonport and Edernish,	11th March, . .
14	Mulroy, . . . . .	North of Sheephaven, .	Downies Pier, . . . .	1st May, . . . .
15	Buncrana, . . . .	Buncrana, . . . . .	Buncrana, . . . . .	3rd May, . . . .
16	Malin Head, . . .	Portmore and Malin Head, .	Malin Head Pier, . . .	10th May, . . .
17	Moville, . . . . .	Lough Foyle, . . . .	Moville, . . . . .	12th April, . .
18	Cloghy, . . . . .	Portavogie, . . . .	Portavogie, . . . .	15th May, . . .
19	Ardglass, . . . .	Ardglass, . . . . .	Ardglass, . . . . .	9th May, . . . .
20	Kilkeel, . . . . .	Kilkeel, . . . . .	Kilkeel Harbour, . . .	11th May, . . .
21	Clogher Head, . .	Clogher Head, . . . .	Clogher Head, . . . .	20th May, . . .

FISHING, 1904. (TABLE No I.)

	Date when Fishing may be said to have ended.	Quantity landed.	Value.	Quantity cured for Exportation.	Quantity sold for local consump- tion.	Quantity despatched to distant markets for sale as <i>fresh Fish.</i>	No.
		Cwts.	£ s. d.				
	31st July, .	10,710½	4,062 15 6	—	—	All.	1
	6th July, .	23,856½	6,252 19 0	—	Small, . .	Nearly all.	2
	2nd July, .	2,301	633 13 6	—	All, . . .	—	3
	7th July, .	568½	184 12 0	—	—	All.	4
	22nd June, .	976½	283 2 0	—	One-fourth, .	Three-fourths,	5
	23rd July, .	9,035	4,677 10 0	—	—	All.	6
	18th July, .	{ 330 49 }	{ 98 3 3 12 9 0 }	—	40 hundreds, .	Nearly all.	7
	—	374½	189 15 9	—	—	All.	8
	16th March, .	2,068	531 7 6	502 barrels,	—	Balance.	9
	June, . . .	2,200	480 0 0	350 barrels, . .	—	Balance.	10
	6th June, .	480	120 0 0	96 barrels, . .	—	—	11
	10th March, .	1,106½	480 6 0	—	—	All.	12
	17th May, .	1,070½	351 9 9	All kippered, . .	—	—	13
	24th June, .	22,858½	10,627 0 0	10,120 half barrels, .	100 crans, . .	—	14
	7th June, .	10,456½	2,605 2 0	800 barrels, . .	—	Balance.	15
	13th June, .	700	400 0 0	All, . . .	—	—	16
	1st May, .	8,641½	2,469 0 0	—	—	All.	17
	31st July, .	2,000	1,000 0 0	—	One-half, . .	One-half.	18
	do. . . . .	14,635½	5,798 9 3	—	One-half, . .	One-half.	19
	do. . . . .	2,844	1,663 5 0	—	About nine-tenths,	Balance.	20
	30th July, .	447½	145 11 0	—	All, . . .	—	21
		122,708½	43,066 10 6				

[continued on next page.]

## SUMMER HERRING

No	Coast Guard Station.	Places where the Herrings were cured.	AVERAGE PRICES						Month in which greatest Quantity captured.
			February.	March.	April.	May.	June.	July.	
1	Howth,	—	—	—	—	£1 per mease.	£1 per mease.	£1 10s. per mease.	July.
2	Dunmore East	Passage East,*	—	—	11s. per mease.	12s. per mease.	18s. per mease.	21s. per mease.	May.
3	{ Ballinacourty, Helvick Head, }	—	—	—	—	14s. 9d. per mease.	16s. 4d. per mease.	20s. per mease.	May.
4	Ballycottin,	—	—	—	4s. per hundred.	3s. to 5s. per hundred.	2s. 6d. to 6s. per hundred.	4s. to 5s. per hundred.	June.
5	East Ferry,	—	—	—	—	10s. per mease.	8s. per mease.	—	May.
6	Upper Cove,	—	—	—	—	14s. per mease.	20s. per mease.	20s. per mease.	May.
7	Castletownbere.	—	2s. & 2s. 6d. per hundred.	—	—	—	—	3s. per hundred.	February.
8	Knightstown,	—	—	—	—	—	6s. 6d. per hundred.	5s. 7d. per hundred.	June.
9	North Aran.	Kilronan,	13s. 9d. per mease.	12s. 6d. per mease.	—	—	—	—	February.
10	Oleggan,	Boffin and Oleggan.	—	—	—	—	£1 5s. 6d. per mease.	—	June.
11	Teelin,	Teelin,	—	—	£1 5s. per cran.	£1 5s. to 18s. per cran.	16s. per cran.	—	May.
12	Portnoo,	—	4s. 3d. per hundred.	2s. 8d. per hundred.	—	—	—	—	February.
13	Burtonport.	Edernish,	—	£1 4s. per cran.	£1 3s. to £1 5s. per cran.	13s. to 24s. per cran.	—	—	April.
14	Mulroy,	Downies,	—	—	—	£1 7s. per cran.	£2 9s. 6d. per cran.	—	May.
15	Buncrana,	Buncrana,	—	—	—	£1 10s. per cran.	£1 10s. per cran.	—	May.
16	Malin Head.	Malin Head Pier.	—	—	—	£1 15s. per cran.	£2 10s. per cran.	—	End of May and beginning of June.
17	Moville,	—	—	—	20s. per cran.	—	—	—	April.
18	Cloghy,	—	—	—	—	7s. 6d. to 18s. per mease.	5s. 6d. to 26s. per mease.	7s. 6d. to 25s. per mease.	June.
19	Ardglass,	—	—	—	—	12s. 8d. per mease.	12s. 6d. per mease.	17s. 6d. per mease.	June.
20	Kilkeel,	—	—	—	—	17s. 10d. per mease.	15s. 9d. per mease.	22s. 7d. per mease.	June.
21	Clogher Head.	—	—	—	—	12s. 7d. per mease.	13s. 2d. per mease.	21s. 6d. per mease.	June.

\* Kipperd.

FISHING, 1904. (TABLE No. I.)—*continued.*

Usual number of Irish large Fishing Vessels (1st or 2nd Class) employed.	Number of Irish Row Boats (not Canoes or Currachs) employed.	Number of Canoes or Currachs employed.	Number of Steam Drifters that fished from Ports within this Station.	Number of Irish Row Boats using Seine or Ring Nets.	No. of Herring boats not belonging to Ireland which usually fished off Stations.				OBSERVATIONS.	No.
					Eng-lish.	Scotch.	Manx.	French		
53	-	-	1	-	45	18	-	-	-	1
3	-	-	-	-	-	48	1	-	-	2
14	-	-	-	-	-	-	-	-	-	3
-	7	-	-	-	-	-	-	-	-	4
3	-	-	-	-	-	14	2	-	-	5
-	-	-	1	-	1	29	-	-	-	6
-	14	-	-	-	-	-	-	-	-	7
-	-	-	-	-	-	-	-	-	Caught in mackerel nets.	8
16	-	-	-	-	-	-	-	-	-	9
-	-	-	-	-	-	-	-	-	Caught in mackerel nets.	10
4	2	-	-	2	-	-	-	-	-	11
-	98	-	-	9	-	-	-	-	-	12
-	-	-	7	-	-	4	4	-	-	13
16	5	-	26	5	11	78	-	-	130 crans caught in February. Price £1 2s. per cran.	14
-	-	-	10	-	10	30	-	-	-	15
3	-	-	-	-	-	-	-	-	-	16
-	-	-	21	-	13	8	-	-	-	17
56	-	-	-	-	-	-	-	-	-	18
46	-	-	-	-	-	25	10	-	-	19
22	-	-	-	-	5	9	3	-	-	20
-	-	-	-	-	-	1	-	-	All landed by boats from other stations.	21

## SUMMER HERRING FISHERY, 1904. (TABLE No. II.)

Herrings were also landed at the places set forth below, which are not included in the foregoing Return.

Coast Guard Station.	Places where landed.	Quantity.	Value.
		Cwts.	£ s. d.
Kingstown, . . .	Kingstown, . . . . .	16	15 16 6
Arklow, . . . .	Arklow, . . . . .	14½	11 6 6
Youghal, . . . .	Youghal, . . . . .	84½	12 0 0
Union Hall, . . .	Union Hall, . . . . .	55½	17 12 6
Portmagee, . . .	Portmagee, . . . . .	160	62 8 0
Ballinskelligs, . .	Ballinskelligs, Horse Island, Dungannon, Boat Cove and Boolakeel.	225	140 0 0
Dingle, . . . . .	Dingle, . . . . .	2½	1 5 0
Smerwick, . . . .	Brandon Creek, . . . . .	5½	2 19 0
Kilcredane, . . .	Carrigaholt and Querrin, . . . . .	6½	4 0 0
Liscannor, . . . .	Liscannor, . . . . .	3	0 15 0
South Aran, . . .	South Aran, . . . . .	*246½	63 5 11
Spiddle, . . . . .	Galway, . . . . .	53	30 12 0
Roundstone, . . .	Roundstone, . . . . .	5	3 0 0
Rossmoney, . . . .	Westport, . . . . .	29	6 0 0
Keel, . . . . .	Doonagh and Keem, . . . . .	3½	2 0 0
Belmullet, . . . .	Belmullet, . . . . .	80	20 0 6
Blacksod Point, . .	Blacksod Point, . . . . .	10	2 0 0
Ballhill, . . . . .	Donegal, . . . . .	47½	7 2 6
Killybegs, . . . .	Killybegs, . . . . .	91½	34 0 0
Malinamore, . . . .	Malinbeg and Glen, . . . . .	100	25 0 0
Portaferry, . . . .	Portaferry, . . . . .	30	12 0 0
Annalong, . . . .	Annalong Harbour, . . . . .	8	2 10 0
Carlingford, . . . .	Carlingford, . . . . .	22	5 10 0
Balbriggan, . . . .	Balbriggan, . . . . .	243½	73 5 0
Skerries, . . . . .	Skerries, . . . . .	181½	98 18 0
Rush, . . . . .	Rush, . . . . .	10	4 16 0
	Total, . . . . .	1,725½	658 2 5

\* 13 barrels cured for exportation.

STATEMENT of the TOTAL QUANTITY and VALUE of FISH landed on the IRISH COASTS during the Month and Seven Months ended 31st July, 1904, compared with the corresponding Periods of the Year 1903.

	July.		Seven Months ended 31st July.	
	1904.	1903.	1904.	1903.
QUANTITY.				
	Owts.	Owts.	Owts.	Owts.
Brill, ... ..	88	92	317	489
Soles, ... ..	262	437	1,779	2,766
Turbot, ... ..	74	85	376	532
Total Prime Fish, ... ..	424	614	2,472	3,787
Cod, ... ..	679	1,102	15,251	12,020
Conger Eel, ... ..	473	644	4,333	4,060
Haddock, ... ..	1,130	1,013	9,259	4,862
Hake, ... ..	1,073	1,202	5,323	4,972
Herrings, ... ..	16,086	13,068	137,535	60,632
Ling, ... ..	215	404	4,671	3,268
Mackerel, ... ..	21,629	16,144	286,736	244,338
Plaice, ... ..	2,049	2,026	11,251	12,559
Ray or Skate, ... ..	814	437	5,897	4,541
Sprats, ... ..	115	143	183	144
Whiting, ... ..	1,306	1,678	14,045	12,311
All other except Shell Fish, ... ..	5,145	4,883	21,377	20,299
Total, ... ..	51,138	43,358	515,308	387,883
Shell Fish:—	No.	No.	No.	No.
Crabs, ... ..	38,745	32,470	83,143	59,799
Lobsters, ... ..	44,375	47,429	90,184	100,480
Oysters, ... ..	—	—	187,144	258,430
Mussels, ... ..	63	1,336	4,913	9,588
Other Shell Fish, ... ..	939	1,381	9,577	11,973
VALUE.				
	£	£	£	£
Brill, ... ..	174	153	862	1,092
Soles, ... ..	1,180	1,304	8,507	10,423
Turbot, ... ..	281	297	1,714	2,494
Total Prime Fish, ... ..	1,635	1,754	11,083	14,009
Cod, ... ..	419	717	9,814	8,488
Conger Eel, ... ..	203	320	2,397	2,520
Haddock, ... ..	914	871	6,912	3,870
Hake, ... ..	917	949	5,308	4,297
Herrings, ... ..	7,066	6,240	46,776	29,107
Ling, ... ..	92	196	2,221	1,694
Mackerel, ... ..	3,961	5,592	64,983	86,085
Plaice, ... ..	1,930	1,882	10,850	12,027
Ray or Skate, ... ..	184	132	1,779	1,558
Sprats, ... ..	14	22	17	23
Whiting, ... ..	625	783	7,515	7,262
All other except Shell Fish, ... ..	2,669	2,137	9,343	10,084
Total, ... ..	20,669	21,595	178,978	181,124
Shell Fish:—				
Crabs, ... ..	169	239	426	450
Lobsters, ... ..	1,457	1,360	3,212	3,555
Oysters, ... ..	—	—	315	265
Mussels, ... ..	2	54	269	396
Other Shell Fish, ... ..	200	409	1,975	2,689
Total, ... ..	1,828	2,062	6,207	7,355
Total Value of Fish Landed, ... ..	22,487	23,657	185,185	188,479

NOTE.—The figures for 1904 are subject to correction in the Annual Returns.



STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Seven Months ended 31st July, 1904, compared with the corresponding Periods of the Year 1903.

	July.		Seven Months ended 31st July.	
	1904.	1903.	1904.	1903.
	QUANTITY.			
	Cwts.	Cwts.	Cwts.	Cwts.
Brill, ... ..	2,014	2,679	16,039	16,108
Soles, ... ..	5,452	5,808	37,613	40,098
Turbot, ... ..	4,961	6,428	39,210	35,815
Other Prime Fish, ... ..	534	593	1,321	3,391
Total Prime Fish, ...	13,061	15,508	94,183	95,412
Cattfish, ... ..	6,598	4,320	30,331	24,673
Cod, ... ..	82,108	81,685	819,672	828,373
Conger Eels, ... ..	3,527	3,918	26,436	23,653
Dabs, ... ..	8,118	9,639	64,868	63,656
Gurnards, ... ..	7,302	10,845	57,518	57,147
Haddock, ... ..	183,546	219,606	1,394,711	1,412,196
Hake, ... ..	58,351	71,716	262,340	241,466
Halibut, ... ..	15,407	15,812	68,098	62,279
Lemon Soles, ... ..	4,333	4,155	24,490	25,793
Ling, ... ..	14,573	20,047	108,931	88,726
Mcgrims, ... ..	5,845	7,225	33,081	26,314
Monks (or Anglers), ... ..	2,339	3,010	21,613	19,354
Plaice, ... ..	52,077	80,656	437,691	551,061
Skates and Rays, ... ..	27,839	34,188	204,135	196,592
Torsk, ... ..	835	929	4,463	5,333
Whiting, ... ..	15,481	17,052	142,172	136,151
Witches, ... ..	3,279	4,601	20,858	23,781
Mackerel, ... ..	19,516	15,538	483,786	326,682
Herrings, ... ..	27,960	61,269	93,505	135,077
Pilchards, ... ..	2,542	5,485	7,543	6,952
Sprats, ... ..	—	—	37,865	35,178
Fish, all other, except Shell Fish, ...	32,519	37,730	269,817	237,816
Total, ... ..	587,156	724,934	4,708,207	4,623,665
Shell Fish:—	No.	No.	No.	No.
Crabs, ... ..	519,403	481,931	4,368,775	4,324,284
Lobsters, ... ..	125,102	131,759	407,227	425,435
Oysters, ... ..	1,194,000	894,000	17,053,100	12,348,000
Other Shell Fish, ... ..	Cwts. 28,882	Cwts. 25,042	Cwts. 199,410	Cwts. 178,483

NOTE.—The figures for 1904 are subject to correction in the Annual Return.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Seven Months ended 31st July, 1904, compared with the corresponding Periods of the Year 1903.

	July.		Seven Months ended 31st July.	
	1904.	1903.	1904.	1903.
	VALUE.			
	£	£	£	£
Brill, ... ..	5,109	6,089	40,845	40,547
Soles, ... ..	35,280	37,694	240,547	264,594
Turbot, ... ..	15,296	19,595	141,750	136,628
Other Prime Fish, ... ..	899	890	1,947	6,584
Total Prime Fish, ...	56,584	64,268	425,089	448,353
Oatfish, ... ..	1,099	1,089	9,173	9,204
Cod, ... ..	37,237	34,039	464,076	481,986
Conger Eels, ... ..	2,236	2,654	20,158	19,691
Dabs, ... ..	5,203	4,859	47,806	37,251
Gurnards, ... ..	1,667	2,508	18,068	18,219
Haddock, ... ..	63,012	65,916	805,940	786,596
Hake, ... ..	24,180	34,437	145,620	150,484
Halibut, ... ..	22,326	25,461	132,983	135,064
Lemon Soles, ... ..	7,515	7,522	53,298	59,334
Ling, ... ..	6,706	8,338	57,302	50,211
Megrims, ... ..	2,814	2,837	20,127	14,613
Monks (or Anglers), ... ..	674	1,099	7,092	7,271
Plaice, ... ..	56,762	72,548	426,005	482,719
Skates and Rays, ... ..	11,740	12,769	108,614	101,329
Torsk, ... ..	327	340	1,896	2,977
Whiting, ... ..	6,015	5,420	66,500	60,783
Witches, ... ..	2,022	2,850	18,431	22,502
Mackerel, ... ..	8,681	8,895	248,651	237,514
Herrings, ... ..	8,447	31,309	43,261	62,632
Pilchards, ... ..	847	1,647	1,649	2,020
Sprats, ... ..	—	—	4,127	5,162
Fish, all other, except Shell Fish, ...	22,592	21,543	151,111	132,206
Total, ... ..	349,046	412,348	3,277,817	3,328,021
Shell Fish :—				
Crabs, ... ..	7,871	7,698	43,549	45,059
Lobsters, ... ..	5,463	5,856	18,860	19,641
Oysters, ... ..	2,350	2,337	47,006	37,498
Other Shell Fish, ... ..	11,773	10,947	63,966	59,697
Total, ... ..	27,457	26,838	173,381	161,895
Total value of all Fish, ...	376,503	439,186	3,451,228	3,489,916

NOTE.—The figures for 1904 are subject to correction in the Annual Return.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the SCOTTISH COASTS during the Month and Seven Months ended 31st July, 1904, compared with the corresponding periods of the Year 1903.

	July.		Seven Months ended July.	
	1904.	1903.	1904.	1903.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Sparling, ... ..	4	5	75	40
Turbot, ... ..	791	1,113	4,010	5,461
Cod, ... ..	46,709	45,079	432,047	310,407
Conger Eel, ... ..	1,102	351	12,653	6,651
Flounders, Plaice, Brill, ... ..	5,729	7,216	49,411	62,056
Haddock, ... ..	72,053	71,359	520,749	504,726
Halibut, ... ..	6,212	4,789	27,037	19,108
Herrings, ... ..	1,747,101	1,407,593	2,967,366	2,464,557
Lemon Soles, ... ..	3,223	3,633	14,217	14,317
Ling, ... ..	18,773	8,894	90,436	60,037
Mackerel, ... ..	4,445	2,454	5,254	3,388
Smith (Coal Fish), ... ..	10,318	8,660	58,840	55,146
Skate, ... ..	7,484	5,213	69,540	46,056
Sprats, ... ..	—	—	20,849	32,728
Torsk (Tusk), ... ..	2,256	701	8,465	7,436
Whiting, ... ..	9,045	7,845	79,572	78,022
Fish not separately distinguished, except Shell Fish, ... ..	7,400	5,090	57,589	37,272
Total, ... ..	1,912,614	1,579,995	4,418,110	3,707,348
Shell Fish:—	No.	No.	No.	No.
Crabs, ... ..	102,395	185,713	1,602,337	1,887,261
Lobsters, ... ..	63,324	60,034	379,749	348,646
Oysters, ... ..	—	700	141,139	94,282
	Cwts.	Cwts.	Cwts.	Cwts.
Clams, ... ..	60	65	3,993	2,005
Mussels, ... ..	3,599	6,126	43,868	56,139
Other Shell Fish, ... ..	3,147	4,355	36,313	35,662
VALUE.				
	£	£	£	£
Sparling, ... ..	29	25	291	191
Turbot, ... ..	1,747	2,517	12,492	17,581
Cod, ... ..	14,912	15,653	166,746	144,082
Conger Eel, ... ..	437	135	6,050	3,851
Flounder, Plaice, Brill, ... ..	7,212	9,286	61,244	81,549
Haddock, ... ..	23,553	26,416	283,742	282,864
Halibut, ... ..	7,643	6,067	40,626	31,168
Herrings, ... ..	326,222	409,342	622,066	768,437
Lemon Soles, ... ..	4,498	5,525	27,827	28,406
Ling, ... ..	5,020	2,382	30,404	23,115
Mackerel, ... ..	1,556	912	1,984	1,339
Smith (Coal Fish) ... ..	1,350	1,367	10,364	10,055
Skate, ... ..	1,022	731	18,458	13,536
Sprats, ... ..	—	—	1,004	2,440
Torsk (Tusk), ... ..	506	128	1,911	1,736
Whiting, ... ..	2,116	2,493	28,945	30,504
Fish not separately distinguished, except Shell Fish, ... ..	2,610	1,095	33,794	10,434
Total, ... ..	400,433	484,074	1,347,937	1,451,268
Shell Fish:—				
Crabs, ... ..	1,354	1,316	10,868	12,204
Lobsters, ... ..	2,813	2,781	20,177	17,751
Oysters, ... ..	—	1	528	398
Clams, ... ..	13	10	567	285
Mussels, ... ..	262	375	2,745	3,371
Other Shell Fish, ... ..	909	1,209	10,133	9,041
Total, ... ..	5,341	5,692	44,698	43,050
Total Value of Fish landed, ... ..	405,774	489,766	1,392,635	1,494,318

NOTE.—The above figures are subject to correction in the Annual Returns.

RETURN of AVERAGE PRICES for each PROVINCE and for the WHOLE OF IRELAND of certain CLASSES of AGRICULTURAL PRODUCTS and LIVE STOCK for the QUARTER ended 30th JUNE, 1904, and for the WHOLE OF IRELAND for the corresponding QUARTER of 1903.

PRODUCT.	PROVINCE.				Whole of Ireland, 1904.	Whole of Ireland, 1903.
	Leinster.	Munster.	Ulster.	Con-naught.		
CROPS :—	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Wheat, per 112 lbs.	—	—	—	—	—	—
White Oats, . . .	—	6 9½	6 5	7 6½	6 5½	6 3¾
Black Oats, . . .	6 2	6 0	—	—	6 1½	5 9¾
Barley, . . .	—	—	—	—	—	—
Hay, . . .	3 11½	3 8	3 8½	3 11	3 9½	2 9
Potatoes, . . .	4 3	4 4½	3 10½	3 10	4 0½	3 9½
Flax, . . . per 14 lbs.	—	—	—	—	—	—
Perennial Rye Grass Seed, per 112 lbs.	—	—	—	—	—	—
Italian Rye Grass Seed, . . .	—	—	—	—	—	—
BUTTER, . . .	85 6½	83 7	82 4½	79 0½	83 7½	90 11½
EGGS, . . . per 120.	6 2	6 3	—	5 4½	5 10½	5 8½
WOOL, . . . per lb.	0 9½	0 9½	—	—	0 9½	0 6½
PORK, . . . per 112 lbs.	—	42 9½	44 3	40 7	42 10½	47 7½
BEEF, . . .	—	—	—	—	60 0	60 3½
MUTTON, . . .	—	—	—	—	70 11½	70 6½
STORE CATTLE :—	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
One year old, per head,	7 0 9	7 5 0	6 3 11	6 10 8	6 15 8	6 17 3
Two years old, . . .	10 4 3	9 4 1	8 11 5	9 0 6	9 4 1	9 13 9
Three years old, . . .	13 5 11	13 8 6	7 4 2	12 4 5	12 13 6	13 8 5
Springers, . . .	14 9 7	13 1 0	12 2 3	13 12 4	13 0 6	14 2 2
STORE SHEEP :—						
Lambs, . . . per head,	1 5 0	1 5 9	1 6 10	1 0 1	1 5 5	1 4 9
Over 12 & under 24 months old, . . .	1 18 1	1 18 11	1 0 11	1 18 7	1 18 5	1 16 9
Two years old and upwards, . . .	—	2 2 11	1 4 3	1 12 10	1 12 10	1 10 3

\* 3rd Class.

STATEMENT showing the AVERAGE PRICES of WHEAT, BARLEY and OATS per 112 lbs., computed from Market Returns of certain quantities of these Cereals supplied to the Department of Agriculture and Technical Instruction for Ireland by Inland Revenue Officers, for each Week of the QUARTER ended 30th JUNE, 1904.

Returns received in the Week ended		WHEAT.		BARLEY.		OATS.	
		Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.
		<i>s. d.</i>	Cwts. of 112 lbs.	<i>s. d.</i>	Cwts. of 112 lbs.	<i>s. d.</i>	Cwts. of 112 lbs.
April,	2, . .	—	—	—	—	6 1	2,739½
"	9, . .	—	—	—	—	6 1½	2,126½
"	16, . .	—	—	—	—	6 2½	1,613½
"	23, . .	—	—	—	—	6 2½	1,943½
"	30, . .	—	—	—	—	6 3½	2,536½
May	7, . .	—	—	—	—	6 2	1,779½
"	14, . .	—	—	—	—	6 3	1,540
"	21, . .	—	—	—	—	6 5	1,398
"	28, . .	—	—	—	—	6 6½	1,424
June,	4, . .	—	—	—	—	6 7½	1,300½
"	11, . .	—	—	—	—	6 7	887
"	18, . .	—	—	—	—	6 8½	1,055½
"	25, . .	—	—	—	—	6 8	1,087

TABLE showing the AVERAGE PRICE per 112 lbs., LIVE WEIGHT, of FAT CATTLE and FAT SHEEP sold in the DUBLIN MARKET during the QUARTER ended 30th JUNE, 1904, and also for the corresponding period during the seven preceding years.

DESCRIPTION.	YEAR.							
	1904.	1903.	1902.	1901.	1900.	1899.	1898.	1897.
	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
Fat Cattle.	34 3½	34 5½	37 4	33 4	34 11½	33 7½	30 6½	33 3½
„ Sheep.	40 6½	40 3½	37 0	38 0	40 1	36 3½	34 9	37 10½

STATEMENT showing the NUMBERS of CATTLE and SHEEP in respect of which "LIVE WEIGHT" Returns have been furnished to the Department of Agriculture and Technical Instruction for Ireland, as under, during the Quarter ended 30th June, 1904.

WEEK ENDED	Numbers included in Returns of Live Weight of Fat Cattle furnished by				Numbers included in Returns of Live Weight of Store Cattle furnished by Official Reporters of Prices.	Total Number of Cattle included in Returns.	Numbers included in Returns of Live Weight of Fat Sheep furnished by		Total Number of Sheep included in Returns.
	Dublin Corporation Market Authorities.		Mr. Gavin Low (Dublin).				Dublin Corporation Market Authorities.	Mr. Gavin Low (Dublin).	
April 2. . . . .	78	120	58	—	256	30	162	192	
" 9. . . . .	69	83	21	—	173	40	203	213	
" 16. . . . .	50	69	30	—	149	43	238	281	
" 23. . . . .	61	80	40	—	181	40	207	247	
" 30. . . . .	53	101	37	10	201	64	198	262	
May 7. . . . .	64	61	27	21	173	26	164	190	
" 14. . . . .	53	65	39	—	157	47	244	291	
" 21. . . . .	58	77	43	—	178	35	213	248	
" 28. . . . .	60	41	44	—	145	44	317	361	
June 4. . . . .	68	38	40	—	146	30	286	316	
" 11. . . . .	59	43	45	—	152	42	387	429	
" 18. . . . .	94	81	31	—	506	14	219	283	
" 25. . . . .	69	76	47	20	212	61	239	290	
Totals. . . . .	836	940	502	51	2,329	506	3,127	3,633	

## TABLES SHOWING THE EXPORTS

## TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT  
PORTS of EMBARKATION

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ballina, . . .	4	.	19	.	23	22	686	608	368	.	268
Belfast, . . .	4,431	31,244	45	579	36,299	783	2,656	3,439	2,076	4,111	6,187
Coleraine, . . .	7	846	20	.	873	42	.	42	32	.	82
Cork, . . .	262	6,820	72	9,223	16,377	7,789	12,681	20,461	5,179	91	5,270
Drogheda, . . .	1,514	603	.	.	2,117	6,448	21,659	28,007	1,612	739	2,351
Dublin, . . .	9,614	29,969	7	3,000	42,640	30,362	(9,454	99,816	36,968	84	37,052
Dundalk, . . .	854	4,160	.	.	5,004	624	4,827	5,451	2,613	2,309	4,922
Dundrum (Co. Down), . . .	.	245	.	.	245	.	.	.	.	.	.
Greenore, . . .	670	7,249	.	20	7,939	4,715	2,797	7,512	321	134	455
Larne, . . .	461	3,523	.	.	9,984	158	76	234	50	3,424	3,474
Limerick, . . .	46	636	.	.	682	6	.	6	1	.	1
Londonderry, . . .	4,209	14,511	180	3,757	22,657	5,899	5,121	11,020	1,030	1,231	2,261
Newry, . . .	280	1,825	.	.	2,106	388	1,345	1,733	290	597	887
Portrush, . . .	3	237	.	.	240	.	.	.	149	.	149
Sligo, . . .	.	366	.	117	483	486	678	1,164	6,831	.	6,831
Warrenpoint, . . .	.	.	.	.	.	.	.	.	.	.	.
Waterford, . . .	2,236	12,166	21	1	14,424	4,114	7,479	11,593	8,543	.	8,543
Westport, . . .	12	25	25	.	62	1,904	1,754	3,658	1,596	.	1,596
Wexford, . . .	937	1,753	2	30	2,722	3,241	2,800	6,041	4,029	.	4,029
Total, . . .	25,540	122,168	391	16,787	164,876	66,972	133,813	200,785	71,688	12,720	84,408

## AND IMPORTS OF ANIMALS.

## I.

BRITAIN during the Three Months ended 30th JUNE, 1904, showing the  
in Ireland.

Gtats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	.	.	.	.	.	999	Ballina.
57	7	990	1,839	2,836	1	12	48,831	Belfast.
.	.	.	5	5	.	.	952	Coleraine.
10	1	121	210	332	1	201	42,652	Cork.
8	.	19	27	46	.	.	32,529	Drogheda.
23	29	1,111	818	1,948	.	38	181,557	Dublin.
649	.	181	221	402	.	74	16,502	Dundalk.
.	.	.	.	.	.	.	245	Dundrum (Co. Down).
516	.	941	583	1,524	.	129	18,075	Greenore.
.	1	52	82	135	.	.	13,827	Larne.
.	.	1	2	3	.	.	692	Limerick.
.	1	104	104	209	.	3	36,150	Londonderry.
6	.	15	10	25	.	13	4,769	Newry.
.	.	2	.	2	.	.	391	Portrush.
.	.	1	.	1	.	.	8,479	Sligo.
.	.	.	.	.	.	.	.	Warrenpoint.
3	1	388	354	743	.	197	35,503	Waterford
.	.	.	.	.	.	.	5,316	Westport.
.	.	3	3	6	.	.	12,798	Wexford.
1,272	40	3,929	4,288	8,257	2	667	480,267	Total.



TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT  
PORTS of DEBARKATION

BRITISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ardrossan, .	206	4,610	14	129	4,989	.	52	52	69	3,987	3,956
Ayr, . . .	595	9,454	.	213	10,262	288	624	912	124	2,777	2,901
Barrow, . .	1,061	7,894	.	28	8,983	.	59	59	1,608	444	2,052
Bristol, . .	695	7,014	2	3,658	11,369	6,754	1,255	8,009	4,680	.	4,680
Dover, . . .	.	.	.	.	.	.	.	.	.	.	.
Falmouth, .	.	.	.	.	.	.	.	.	.	.	.
Fleetwood .	2,899	5,432	.	18	8,349	2,549	3,121	5,670	168	164	332
Glasgow, . .	1,632	17,623	289	6,610	25,954	1,174	4,735	5,909	10,291	829	11,120
Greenock, . .	151	2,850	38	10	3,049	35	20	55	104	404	508
Holyhead, .	3,616	18,307	2	331	22,256	14,260	22,440	36,700	18,382	217	18,599
Liverpool, .	9,369	22,875	46	1,514	33,804	33,770	86,650	120,420	25,288	2,020	27,308
London, . .	.	.	.	.	.	.	.	.	.	.	.
Manchester, .	1,961	1,068	.	.	3,029	4,005	5,053	9,058	976	.	970
Milford, . .	1,807	6,848	.	3,580	12,235	2,762	8,564	11,326	6,465	.	6,465
Morecambe, .	413	7,964	.	45	8,422	1,252	1,240	2,492	3,423	50	3,473
Newhaven, .	.	74	.	.	74	.	.	.	.	.	.
Newport, . .	.	.	.	.	.	.	.	.	.	.	.
Plymouth, .	131	97	.	132	360	.	.	.	.	.	.
Portsmouth, .	.	.	.	.	.	.	.	.	.	.	.
Silloth, . . .	650	1,395	.	.	2,045	44	.	44	75	.	75
Southampton, .	6	224	.	619	849	79	.	79	41	.	41
Stranraer, . .	448	8,154	.	.	8,602	.	.	.	.	1,928	1,928
Whitehaven, .	.	245	.	.	245	.	.	.	.	.	.
Total, . . .	26,540	122,168	391	16,787	164,876	66,972	133,813	200,785	71,088	12,720	84,408

## II.

BRITAIN during the Three Months ended 30th JUNE, 1904, showing the  
in Great Britain.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	BRITISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
59	2	183	403	588	.	12	9,656	Ardrossan.
.	1	57	123	181	.	2	14,258	Ayr.
.	.	142	330	472	.	6	11,572	Barrow.
2	.	100	110	210	1	278	24,549	Bristol.
.	.	.	.	.	.	.	.	Dover.
.	.	.	.	.	.	.	.	Falmouth.
1	4	383	521	908	.	1	15,261	Fleetwood.
3	.	209	333	542	.	1	43,529	Glasgow.
.	1	4	7	12	.	1	3,625	Greenock.
520	28	1,742	1,179	2,949	.	133	81,157	Holyhead.
675	1	604	720	1,325	1	115	183,648	Liverpool.
.	.	.	.	.	.	.	.	London.
3	.	22	24	46	.	.	13,106	Manchester.
9	1	385	417	803	.	117	30,955	Millford.
.	.	17	10	27	.	1	14,415	Morecambe.
.	.	.	.	.	.	.	74	Newhaven.
.	.	.	.	.	.	.	.	Newport.
.	.	11	7	18	.	.	378	Plymouth.
.	.	.	.	.	.	.	.	Portsmouth.
.	1	11	9	21	.	.	2,185	Silloth.
.	.	7	13	20	.	.	969	Southampton.
.	1	52	82	135	.	.	10,665	Stranraer.
.	.	.	.	.	.	.	245	Whitehaven.
1,272	40	3,929	4,388	8,257	2	667	460,267	Total.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT  
of DEBARKATION

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ballina, . . .	.	.	1	.	1	.	.	.	.	.	.
Belfast, . . .	.	30	.	.	30	1,260	.	1,260	.	1	1
Coleraine, . . .	.	.	.	.	.	.	.	.	.	.	.
Cork, . . .	.	.	.	.	.	.	.	.	.	.	.
Drogheda, . . .	.	.	.	.	.	22	.	22	.	2	2
Dublin, . . .	.	163	.	3	166	520	.	520	.	.	.
Dundalk, . . .	.	.	.	.	.	.	.	.	.	.	.
Greenore, . . .	.	.	.	.	.	.	.	.	.	.	.
Larne, . . .	.	10	.	.	10	.	.	.	.	1	1
Limerick, . . .	.	.	.	.	.	.	.	.	.	.	.
Londonderry, . . .	.	2	.	.	2	1	.	1	.	10	10
Newry, . . .	.	.	.	.	.	.	.	.	.	1	1
Portrush, . . .	.	.	.	.	.	.	.	.	.	.	.
Sligo, . . .	.	.	.	.	.	.	.	.	.	1	1
Waterford, . . .	.	13	.	.	13	.	.	.	.	.	.
Westport, . . .	.	.	.	.	.	.	.	.	.	.	.
Wexford, . . .	.	.	.	.	.	.	.	.	.	.	.
Total, . . .	.	218	1	3	222	1,803	.	1,803	.	16	16

## III.

BRITAIN during the Three Months ended 30th JUNE, 1904, showing the PORTS in Ireland.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Matron.	Geldings.	Total.				
.	.	.	1	1	.	.	2	Ballina.
.	9	71	145	225	.	2	1,518	Belfast.
.	.	.	1	1	.	.	1	Coleraine.
.	.	17	32	49	.	.	49	Cork.
.	.	4	5	9	.	.	33	Drogheda.
.	44	531	379	954	.	1	1,641	Dublin.
.	.	9	23	32	.	.	32	Dundalk.
.	.	30	16	46	.	.	46	Greenore.
.	2	16	14	32	.	.	43	Larne.
.	.	.	.	.	.	.	.	Limerick.
.	6	25	23	53	.	.	66	Londonderry.
.	1	4	5	10	.	.	11	Newry.
.	.	.	1	1	.	.	1	Portrush.
.	.	.	.	.	.	.	1	Sligo.
.	6	55	60	121	.	.	134	Waterford.
.	.	.	.	.	.	.	.	Westport.
.	.	5	8	13	.	.	13	Wexford.
.	67	767	713	1,547	.	3	3,591	Total.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT BRITAIN  
EMBARKATION in

BRITISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ardrospan, . . .	.	6	.	.	6	985	.	985	.	.	.
Ayr, . . .	.	2	.	.	2	274	.	274	.	.	.
Barrow, . . .	.	6	.	.	6	.	.	.	.	.	.
Bristol, . . .	.	5	.	.	5	.	.	.	.	.	.
Cardiff, . . .	.	.	.	.	.	.	.	.	.	.	.
Falmouth, . . .	.	.	.	.	.	.	.	.	.	.	.
Fleetwood, . . .	.	3	.	.	3	.	.	.	.	.	.
Glasgow, . . .	.	37	1	1	39	478	.	478	.	.	.
Greenock, . . .	.	.	.	.	.	.	.	.	.	.	.
Holyhead, . . .	.	103	.	1	104	12	.	12	.	.	.
Liverpool, . . .	.	37	.	1	38	22	.	22	.	4	4
London, . . .	.	.	.	.	.	.	.	.	.	.	.
Manchester, . . .	.	1	.	.	1	.	.	.	.	.	.
Milford, . . .	.	1	.	.	1	.	.	.	.	.	.
Morecambe, . . .	.	.	.	.	.	.	.	.	.	10	10
Newhaven, . . .	.	.	.	.	.	.	.	.	.	1	1
Plymouth, . . .	.	.	.	.	.	.	.	.	.	.	.
Silloth, . . .	.	.	.	.	.	32	.	32	.	.	.
Southampton, . . .	.	7	.	.	7	.	.	.	.	.	.
Stranraer, . . .	.	10	.	.	10	.	.	.	.	1	1
Whitehaven, . . .	.	.	.	.	.	.	.	.	.	.	.
Total, . . .	.	218	1	3	222	1,803	.	1,803	.	16	16

## IV.

during the Three Months ended 30th JUNE, 1904, showing the PORTS of Great Britain.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	BRITISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	1	7	17	25	.	.	1,016	Ardrossan.
.	.	3	9	12	.	.	288	Ayr.
.	1	6	10	16	.	.	22	Barrow.
.	4	12	18	34	.	.	39	Bristol.
.	.	.	.	.	.	.	.	Cardiff.
.	.	.	.	.	.	.	.	Falmouth.
.	8	44	71	123	.	1	127	Fleetwood.
.	6	54	51	110	.	1	628	Glasgow.
.	1	5	4	10	.	.	10	Greenock.
.	41	485	333	859	.	.	975	Holyhead.
.	2	73	117	192	.	1	257	Liverpool.
.	.	.	2	2	.	.	2	London.
.	1	5	4	10	.	.	11	Manchester.
.	1	55	58	114	.	.	115	Milford.
.	.	1	2	3	.	.	13	Morecambe.
.	.	.	.	.	.	.	1	Newhaven.
.	.	1	4	5	.	.	5	Plymouth.
.	.	.	.	.	.	.	32	Silloth.
.	.	2	3	5	.	.	12	Southampton.
.	2	15	10	27	.	.	38	Stranraer.
.	.	.	.	.	.	.	.	Whitehaven.
.	67	767	713	1,547	.	3	3,591	Total.

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the  
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs.	Total.
BELFAST, . . . . .	.	93	.	.	93	.	.	.
DUBLIN, . . . . .	5	.	.	47	52	.	20	20
TOTAL, . . . . .	5	93	.	47	145	.	20	20

RETURN of NUMBER of ANIMALS EXPORTED from IRELAND to the  
showing the PORTS of DEBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs.	Total.
DOUGLAS, . . . . .	5	93	.	47	145	.	20	20

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the  
showing the PORTS of

IRISH PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs.	Total.
BELFAST, . . . . .	.	.	.	.	.	.	.	.

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the  
showing the PORTS of EMBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs.	Total.
DOUGLAS, . . . . .	.	.	.	.	.	.	.	.

ISLE OF MAN during the Three Months ended 30th JUNE, 1904,  
EMBARKATION in IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	10	.	26	64	90	.	.	193	BELFAST.
.	.	.	.	.	.	2	2	.	.	74	DUBLIN.
.	.	.	10	.	26	66	92	.	.	267	TOTAL.

ISLE OF MAN during the Three Months ended 30th JUNE, 1904,  
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	10	.	26	66	92	.	.	267	DOUGLAS.

ISLE OF MAN during the Three Months ended 30th JUNE, 1904,  
DEBARKATION in IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORT.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	.	.	.	.	.	.	BELFAST.

ISLE OF MAN during the Three Months ended 30th JUNE, 1904,  
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	.	.	.	.	.	.	DOUGLAS.



## COASTING AND

RETURN of the NUMBER of ANIMALS SHIPPED to and from Places in Ireland  
of Embarkation

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, . . . . .	.	.	.	.	.	.	.	.	.	5	5
„ to Belfast, . . . . .	.	1	.	.	1	.	.	.	.	.	.
„ to Dublin, . . . . .	.	1	.	.	1	.	.	.	.	.	.
Total, . . . . .	.	2	.	.	2	.	.	.	.	5	5
Aghada Pier to Cork, . . . . .	.	.	.	1	1	58	48	106	183	.	183
Belfast to Waterford, . . . . .	.	.	.	.	.	.	.	.	.	.	.
Waterford to Ballyhack, . . . . .	.	53	7	.	60	.	.	.	.	.	.
„ to Belfast, . . . . .	.	.	.	.	.	.	.	.	.	.	.
„ to Cork, . . . . .	.	2	.	.	2	.	.	.	.	.	.
„ to Duncannon, . . . . .	.	110	.	155	265	3	5	8	6	.	6
„ to New Ross, . . . . .	.	153	.	316	469	2	3	5	13	18	31
Total, . . . . .	.	318	7	471	796	5	8	13	19	18	37
Duncannon to Waterford, . . . . .	376	363	1	.	740	263	210	473	1,620	.	1,620
New Ross to Waterford, . . . . .	183	351	.	.	534	1,275	1,106	2,381	1,943	.	1,943
Kilrush to Limerick, . . . . .	.	118	.	.	118	.	.	.	115	119	234
Portumna „ . . . . .	.	.	.	.	.	.	.	.	.	.	.
Banagher „ . . . . .	.	.	.	.	.	.	.	.	.	134	134
Total, . . . . .	.	118	.	.	118	.	.	.	115	253	368
Limerick to Kilrush, . . . . .	.	3	.	.	3	.	.	.	.	.	.
Londonderry to Moville, . . . . .	.	15	.	.	15	50	.	50	2	.	2
Moville to Londonderry, . . . . .	19	290	.	.	309	49	37	86	50	34	84
Greenore to Greencastle, . . . . .	9	.	.	.	9	.	.	.	.	.	.
Greencastle to Greenore, . . . . .	.	375	.	.	375	131	81	212	.	.	.
Belmullet to Sligo, . . . . .	.	41	.	.	41	.	25	25	91	.	91
Sligo to Belmullet, . . . . .	.	.	.	.	.	.	.	.	.	.	.
Total, . . . . .	587	1,876	8	472	2,913	1,831	1,516	3,346	4,028	310	4,338

## INLAND NAVIGATION.

during the Three Months ended 30th June, 1904, showing the Places and Debarkation.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	.	.	.	.	.	5	Cork to Aghada Pier,
.	.	.	.	.	.	.	1	" to Belfast.
.	.	.	.	.	.	.	1	" to Dublin.
.	.	.	.	.	.	.	7	Total.
.	.	.	.	.	.	.	290	Aghada Pier to Cork.
.	.	2	.	2	.	.	2	Belfast to Waterford.
.	.	.	.	.	.	.	60	Waterford to Ballyhack.
.	.	.	1	1	.	.	1	" to Belfast.
.	.	.	.	.	.	.	2	" to Cork.
.	.	2	1	3	.	5	287	" to Duncannon.
.	.	.	1	1	.	.	506	" to New Ross.
.	.	2	3	5	.	5	856	Total.
.	.	8	7	15	.	.	2,343	Duncannon to Waterford.
.	.	3	.	3	.	.	4,866	New Ross to Waterford.
.	.	.	.	.	.	.	252	Kilrush to Limerick.
.	.	.	.	.	.	.	.	Portumna "
.	.	.	.	.	.	.	134	Banagher "
.	.	.	.	.	.	.	486	Total.
.	.	.	.	.	.	.	3	Limerick to Kilrush.
.	.	.	.	.	.	.	67	Londonderry to Moville.
.	.	2	2	4	.	.	483	Moville to Londonderry.
.	.	.	.	.	.	.	9	Greenore to Greencastle.
.	.	.	.	.	.	.	587	Greencastle to Greenore.
.	1	.	.	1	.	.	158	Belmullet to Sligo.
.	1	.	.	1	.	.	1	Sligo to Belmullet.
.	2	17	12	31	.	5	10,663	Total.

RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30th JUNE, 1904, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast, . . . . .	—	219	110	329
Cork, . . . . .	—	1	8	9
Dublin, . . . . .	—	28	45	73
Greenore, . . . . .	—	360	193	553
Waterford, . . . . .	—	76	52	128
Total, . . . . .	—	684	408	1,092

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30th JUNE, 1904, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast, . . . . .	1	16	28	45
Dublin, . . . . .	1	5	4	10
Waterford, . . . . .	4	2	—	6
Total, . . . . .	6	23	32	61

## CREAMERY BUTTER PRICE STATISTICS.

Week ending	Copenhagen Top Quotations.		Manchester.				Lb. Rolls. In 24-lb. case. Per Cwt.	
	Kroner per 50 Kilos.	Shil- lings per = Cwt. ap- prox- imately.	Danish and Swedish Choicest.		Irish Creameries Choicest.		Danish. Free on rail, London.	Irish. Carriage paid. Passen- ger Train.
			All landed.				Cash with Order.	
	Kr.	s. d.	s.	s.	s.	s.	s. d.	s. d.
June, . 11,	77	86 4	96 to 98		88 to 90		99 2	99 2
" . 18,	81	90 9	98 to 100		91 to 93		103 10	103 10
" . 25,	81	90 9	104 to 106		95 to 97		103 10	103 10
July, . 2,	81	90 9	103 to 104		93 to 95		103 10	103 10
" . 9,	81	90 9	102 to 103		91 to 93		103 10	103 10
" . 16,	81	90 9	101 to 103		89 to 92		105 0	103 10
" . 23,	81	90 9	101 to 103		89 to 92		105 0	103 10
" . 30,	83	93 2	102 to 104		90 to 94		107 4	106 2
August, . 6,	86	96 6	106 to 107		95 to 97		110 10	109 8
" . 13,	89	99 9	109 to 111		101 to 104		114 4	113 2
" . 20,	92	103 3	113 to 115		104 to 106		117 10	116 8
" . 27,	92	103 3	116 to 118		106 to 108		117 10	116 8
September, . 3,	92	103 3	116 to 117		104 to 106		117 10	116 8
" . 10,	95	106 7	115 to 117		101 to 104		121 4	120 2
" . 17,	100	112 3	120 to 122		102 to 106		127 2	126 0

From Manchester prices, from 8s. to 10s. must be deducted in order to arrive at the net return to a Danish Creamery; and from 5s. to 7s. to get net return to an Irish Creamery.

Danish pound rolls are free on rail, London, wrapped in parchment and in cardboard boxes.

Irish pound rolls are carriage paid per passenger train, wrapped in parchment and in cardboard boxes.

If rolls are not packed in cardboard boxes, deduct  $\frac{1}{2}d.$  per lb. = 1s. 2d. per cwt.

An extra charge of  $\frac{1}{2}d.$  per lb. is made where cash does not arrive with order.

Carriage on pound rolls per passenger train is  $\frac{1}{2}d.$  per lb., excluding box; allowing for weight of box, carriage works out at 5s. 2d. to 5s. 8d. per cwt. of butter.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL  
into Ireland in each WEEK from

ARTICLES.	WEEK ENDED					
	4th June.	11th June.	18th June.	25th June.	2nd July.	
<b>ANIMALS, LIVING—</b>						
Horses, . . . . .	.	.	.	.	.	
<b>FRESH MEAT—</b>						
Beef, . . . . . cwt.	.	.	.	.	.	
Mutton, . . . . . "	.	.	.	.	.	
<b>SALTED OR PRESERVED MEAT—</b>						
Bacon, . . . . . cwt.	.	.	.	.	.	
Beef, . . . . . "	.	.	.	.	.	
Hams, . . . . . "	.	3	.	.	.	
Pork, . . . . . "	197	.	403	125	.	
Meat, unenumerated, Salted or Fresh, . . . . . "	.	.	.	.	.	
Meat preserved otherwise than by salting, . . . . . cwt.	.	.	.	.	428	
<b>DAIRY PRODUCE AND SUBSTITUTES—</b>						
Butter, . . . . . cwt.	.	.	80	.	.	
Margarine, . . . . . "	62	110	103	146	182	
Cheese, . . . . . "	.	.	77	.	.	
Milk, Condensed, . . . . . "	.	.	.	.	.	
" Cream, . . . . . "	.	.	.	.	.	
EGGS, . . . . . gt. hunds.	130	.	191	26	25	
LARD, . . . . . cwt.	.	98	57	.	.	
<b>CORN, GRAIN, MEAL, AND FLOUR—</b>						
Wheat, . . . . . cwt.	98,000	255,000	248,100	210,100	146,100	
Wheat, Meal and Flour . . . . . "	4,600	25,100	32,900	30,500	21,500	
Barley, . . . . . "	.	11,900	10,100	.	19,600	
Oats, . . . . . "	.	22,700	10,400	15,800	13,700	
Peas, . . . . . "	50	190	20	220	180	
Beans, . . . . . "	.	.	.	.	.	
Maize or Indian Corn, . . . . . "	312,200	180,800	118,100	116,700	443,700	
<b>FRUIT, RAW—</b>						
Apples, . . . . . cwt.	.	.	.	.	.	
Currants, . . . . . "	.	.	.	.	.	
Gooseberries, . . . . . "	136	112	.	.	202	
Pears, . . . . . "	.	.	.	.	.	
Plums, . . . . . "	.	.	.	.	.	
Grapes, . . . . . "	.	.	.	.	.	
Lemons, . . . . . "	.	.	.	.	.	
Oranges, . . . . . "	.	.	.	.	.	
Strawberries, . . . . . "	.	.	.	.	.	
Unenumerated, . . . . . "	.	.	.	.	.	
HAY, . . . . . tons	144	.	38	361	.	
STRAW, . . . . . "	603	193	.	.	.	
HOPS, . . . . . cwt.	.	.	.	.	.	
<b>VEGETABLES, RAW—</b>						
Onions, . . . . . bushels	.	.	.	.	.	
Potatoes, . . . . . cwt.	33	.	.	.	.	
Unenumerated, . . . . . £	5	.	.	.	.	
Dried, . . . . . cwt.	.	.	.	.	.	
Preserved by Canning, . . . . . "	.	.	.	.	.	
<b>POULTRY AND GAME, . . . . . £</b>	.	.	.	.	.	

\* This Table is confined to the Imports of certain kinds of Agricultural Produce into to a request from this Department kindly consented to separate the Irish Imports (direct) form of Weekly Returns. It is hoped that the Department may soon be able to secure With these and such returns as the above, the Department will be in a position manufactured and agricultural products.

PRODUCE Imported direct (i.e. from the Colonies or Foreign Countries,  
4th June, 1904, to 27th August, 1904\*.

WEEK ENDED							
9th July.	16th July.	23rd July.	30th July.	6th Aug.	13th Aug.	20th Aug.	27th Aug.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	2,338	.
.	.	.	.	.	.	3,970	.
.	.	.	.	.	.	.	.
.	1	.	.	.	.	.	.
.	657	440	.	60	50	702	254
.	.	.	.	.	.	3	.
.	.	.	1,500	.	15	.	.
.	.	.	.	.	.	.	.
92	143	155	185	223	137	164	170
.	3	77	88	4	.	.	215
.	.	37	74	42	42	95	78
.	.	.	.	.	.	.	.
120	310	.	238	175	.	72	197
.	.	.	111	320	.	.	.
.	.	.	.	.	.	.	.
39,100	55,300	186,000	381,200	109,800	47,700	157,900	141,300
2,300	8,200	3,000	16,800	27,900	25,100	.	15,600
.	58,200	2,000	9,200	.	.	.	.
11,600	.	.	2,700	.	.	.	.
160	460	60	70	80	.	.	.
345,600	303,500	72,100	387,700	229,300	385,800	344,300	299,300
.	.	.	.	.	.	53	.
.	308	39	15	.	.	.	.
.	.	24	102	.	.	.	.
.	.	.	.	40	41	10	15
.	.	.	.	3	15	62	38
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	12	.	.	.	.	.	.
.	18	.	21	25	.	.	.
.	.	6	48	192	.	.	.
230	.	.	.	12	.	.	.
.	.	.	.	.	.	.	.
.	.	.	248	.	510	210	140
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

Ireland from the Colonies and Foreign Countries. The Board of Customs have in answer from those of the United Kingdom, and to supply this Department with them in the returns of Imports of all classes into Ireland which are re-shipped from Great Britain, to gauge the economic dependence of this country on other countries for its supplies of

Statistics and Intelligence Branch,  
Department of Agriculture  
and Technical Instruction for Ireland.

# AGRICULTURAL RETURNS OF GREAT BRITAIN, 1904.

PRELIMINARY STATEMENT for 1904, compiled from the RETURNS collected on the 4th June; and comparison with 1903.

## CROPS.

DISTRIBUTION.	1904.	1903.	Increase.		Decrease.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Per Cent.</i>	<i>Acres.</i>	<i>Per Cent.</i>
TOTAL AREA OF LAND AND WATER,	56,786,741	56,786,741	—	—	—	—
TOTAL ACREAGE under all CROPS and GRASS,*	32,323,176	32,343,579	—	—	20,403	0·1
Wheat, . . . . .	1,375,284	1,581,587	—	—	206,303	13·0
Barley, . . . . .	1,840,688	1,858,484	—	—	17,796	1·0
Oats, . . . . .	3,252,975	3,140,242	112,733	3·6	—	—
Rye, . . . . .	55,714	59,064	—	—	3,350	5·7
Beans, . . . . .	252,782	239,655	13,127	5·5	—	—
Peas, . . . . .	175,608	181,511	—	—	5,903	3·3
Potatoes, . . . . .	570,209	564,286	5,923	1·0	—	—
Turnips and Swedes, . . . . .	1,604,103	1,603,301	802	0·1	—	—
Mangold, . . . . .	398,827	401,627	—	—	2,800	0·7
Cabbage, . . . . .	64,627	64,803	—	—	176	0·3
Kohl-Rabi, . . . . .	15,607	19,297	—	—	3,690	19·1
Rape, . . . . .	97,772	99,001	—	—	1,229	1·2
Vetches or Tares, . . . . .	128,229	144,966	—	—	16,737	11·5
Lucerne, . . . . .	55,706	60,355	—	—	4,649	7·7
Other Crops, . . . . .	100,971	106,935	—	—	5,964	5·6
Clover and Rotation Grasses. { For Hay, . . . . .	2,322,789	2,412,445	—	—	89,656	3·7

\* Excluding 12,801,617 acres returned as Mountain and Heath Land used for grazing in 1904, and 12,868,240 acres in 1903.

† The acreage of any Crop or Grass grown under the trees in Orchards is also returned under its proper heading.

PRELIMINARY STATEMENT for 1904, compiled from the RETURNS collected on the 4th June ; and comparison with 1903—*continued*.

## LIVE STOCK.

DISTRIBUTION.	1904.	1903.	Increase.		Decrease.	
	No.	No.	No.	Per Cent.	No.	Per Cent.
Horses used solely for Agriculture,* .	1,120,247	1,106,448	13,799	1·2	—	—
Unbroken Horses :—One year and above.	301,371	297,121	4,250	1·4	—	—
"    "    Under one year.	138,618	133,585	5,033	3·8	—	—
TOTAL OF HORSES, . .	1,560,236	1,537,154	23,082	1·5	—	—
Cows and Heifers in Milk or in Calf, .	2,678,680	2,588,208	90,472	3·5	—	—
Other Cattle :—Two years and above.	1,374,636	1,430,625	—	—	55,989	3·9
"    "    One year and under two.	1,429,833	1,368,136	61,697	4·5	—	—
"    "    Under one year.	1,377,203	1,317,649	59,554	4·5	—	—
TOTAL OF CATTLE, . .	6,860,352	6,704,618	155,734	2·3	—	—
Ewes kept for Breeding, . . . .	9,880,908	9,879,101	1,807	0·0	—	—
Other Sheep :—One year and above, .	5,313,602	5,459,889	—	—	146,287	2·7
"    "    Under one year, . .	10,012,664	10,300,807	—	—	288,143	2·8
TOTAL OF SHEEP, . . . .	25,207,174	25,639,797	—	—	432,623	1·7
Sows kept for Breeding, . . . .	382,056	389,900	—	—	7,844	2·0
Other Pigs, . . . . .	2,479,588	2,296,661	182,927	8·0	—	—
TOTAL OF PIGS, . . . .	2,861,644	2,686,561	175,083	6·5	—	—

\* Including Mares kept for Breeding.

BOARD OF AGRICULTURE.

26th August, 1904.



## DISEASES OF ANIMALS IN IRELAND.

NUMBER of OUTBREAKS of SWINE-FEVER, and Number of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended	SWINE-FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection.
June, 1904. . . . .	44	1,201

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by ANTHRAX and GLANDERS in Ireland in the undermentioned period.

Quarter ended	ANTHRAX.		GLANDERS (including Farcy)	
	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
June, 1904. . . . .	—	—	3	4

NUMBER of Cases of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended	Number of Cases.
June, 1904. . . . .	Nil.

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIC-MANGE in Ireland in the undermentioned period.

Quarter ended	SHEEP-SCAB.		PARASITIC-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
June, 1904. . . . .	46	656	51	78

Veterinary Branch,  
Department of Agriculture and Technical Instruction for Ireland,  
Dublin.

## EMIGRATION.

RETURN of the Numbers, Nationalities, and \*Destinations of the Passengers that left the United Kingdom for places out of Europe during the Month ended 31st July, 1904, and the Seven Months ended 31st July, 1904, compared with the corresponding periods of the previous Year.

NATIONALITY.	BRITISH EMPIRE.						FOREIGN COUNTRIES.			Grand Total.	Total for corresponding Period of 1903.
	British North America.	Australia and New Zealand.	British South Africa.	India, including Ceylon.	Other British Colonies and Possessions.	Total.	United States.	Other Foreign Countries.	Total.		
Month ended 31st July.											
English, . . .	5,668	677	1,721	130	198	8,394	7,256	303	7,569	15,963	15,973
Scotch, . . .	1,378	98	391	13	8	1,888	1,373	22	1,395	3,283	3,661
Irish, . . .	321	84	112	1	1	519	3,028	10	3,038	3,667	2,726
Total of British origin.	7,367	859	2,224	144	207	10,801	11,657	335	11,992	22,798	22,360
Foreigners, . . .	1,517	16	452	10	8	2,003	13,372	256	13,628	15,631	15,611
Nationalities not distinguished.	21	-	-	69	206	296	105	260	365	661	366
Total, . . .	8,905	875	2,676	223	421	13,100	25,134	841	26,975	39,075	38,337
Total for corresponding period, 1903.	10,505	1,087	4,984	251	413	17,240	30,527	570	31,097	38,337	
Seven Months ended 31st July.											
English, . . .	36,273	4,626	10,660	1,517	1,839	54,905	35,246	2,377	37,623	92,428	99,126
Scotch, . . .	8,992	833	2,383	199	116	12,523	7,617	325	7,942	20,365	20,354
Irish, . . .	1,796	423	579	31	19	2,848	22,170	107	22,277	25,125	26,119
Total of British origin.	47,061	5,882	13,612	1,747	1,974	70,176	64,933	2,809	67,742	137,918	145,599
Foreigners, . . .	14,487	122	3,062	83	98	17,842	66,141	1,111	67,252	85,094	113,173
Nationalities not distinguished.	35	2	-	581	1,230	1,848	345	1,148	1,493	3,341	3,384
Total, . . .	61,583	6,006	16,674	2,411	3,302	89,866	131,419	5,068	136,487	226,353	262,156
Total for corresponding period, 1903.	69,956	5,769	34,284	2,267	3,568	115,844	141,957	4,355	146,312	262,156	

\* The destinations given are, in all cases, based on the ports at which the passengers contracted to land.

NOTE.—The above figures, being made up at the earliest possible date after the close of each Month, are subject to correction in the Annual Returns.



**DEPARTMENT OF AGRICULTURE AND TECHNICAL  
INSTRUCTION FOR IRELAND.**

---

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## DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

## PUBLICATIONS OF THE DEPARTMENT.

## LEAFLETS.

NUMBER.	NAME.
Leaflet No. 1	The Warble Fly.
" " 2	<i>Out of Print.</i>
" " 3	<i>Out of Print.</i>
" " 4	Workmen's Compensation Act, 1900.
" " 5	Separated Milk as Food for Calves.
" " 6	Charlock Spraying.
" " 7	Fluke in Sheep.
" " 8	Timothy Meadows.
" " 9	The Turnip Fly.
" " 10	Wireworms.
" " 11	Prevention of White Scour in Calves (Professor Nocard).
" " 11a	do. do. do.
" " 12	<i>Out of print.</i>
" " 13	Contagious Abortion in Cattle.
" " 14	Prevention of Potato Blight.
" " 15	Fertilizers and Feeding Stuffs Act, 1893, and (Amendment) Regulations, 1904.
" " 16	Sheep Scab.
" " 17	The Use and Purchase of Manures.
" " 18	Swine Fever.
" " 19	Early Potato Growing.
" " 20	Calf Rearing.
" " 21	Diseases of Poultry :—Gapes.
" " 22	Basic Slag.
" " 23	Dishorning Calves.
" " 24	Care and Treatment of Premium Bulls.
" " 25	Fowl Cholera.
" " 26	Winter Fattening of Cattle.
" " 27	Breeding and Feeding of Pigs.
" " 28	Blackleg, Black Quarter, or Blue Quarter.
" " 29	Flax Seed.
" " 30	Poultry Parasites—Fleas, Mites, and Lice.
" " 31	Winter Egg Production.
" " 32	Rearing and Fattening of Turkeys.
" " 33	Profitable Breeds of Poultry.
" " 34	The Revival of Tillage.
" " 35	The Liming of Land.
" " 36	Field Experiments—Barley.
" " 37	" " Meadow Hay.
" " 38	" " Potatoes.
" " 39	" " Mangolds.
" " 40	" " Oats.
" " 41	" " Turnips.
" " 42	Permanent Pasture Grasses.
" " 43	The Rearing and Management of Chickens.
" " 44	" Husk " or " Hoose " in Calves.
" " 45	Ringworm on Cattle.
" " 46	Haymaking.
" " 47	The Black Currant Mite.
" " 48	Foul Brood or Bee Pest.
" " 49	Poultry Fattening.
" " 50	Portable Poultry Houses.
" " 51	The Leather-Jacket Grub.
" " 52	Flax Experiments.
" " 53	The Construction of a Cowhouse.
" " 54	Calf Meal ( <i>in the Press</i> ).
" " 55	The Apple.
" " 56	Cultivation of the Root Crop ( <i>in the Press</i> ).
" " 57	Fruit Packing.
" " 58	Sprouting Seed Potatoes ( <i>in the Press</i> ).

Copies of the above leaflets can be obtained free of charge and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.

## PARLIAMENTARY PUBLICATIONS.

Banking and Railway Statistics (Ireland) for the six months ended 31st December, 1903. [1904, Cd. 2109]. Price 7½d.

Banking, Railway, and Shipping Statistics (Ireland) for the six months ended 30th June, 1904. [1904, Cd. 2278]. Price 6½d.

Abstracts showing the Acreage under Crops and the Numbers of Live Stock in Ireland in 1903-1904. [1904, Cd. 2260]. Price 1½d.

Extent in Statute Acres and Produce of the Crops in Ireland in 1904. [1904, Cd. 2339]. Price 3½d.

Report on Irish Migratory Labourers, 1904. [1904, Cd. 2332]. Price 3d.

Return of Prices of certain classes of Irish Agricultural Products and Live Stock for 1903. [1904, Cd. 2072]. Price 1s. 2d.

Report of Proceedings under the Diseases of Animals Acts for the year 1903. [1904, Cd. 2110]. Price 8½d.

Sea and Inland Fisheries of Ireland, 1902. Part I. General Report. [1903, Cd. 1712]. Price 1s. 2d.

Sea and Inland Fisheries of Ireland, 1901. Part II. Scientific Investigations. [1903, Cd. 1577]. Price 4s. 5d.

Third Annual General Report of the Department, 1902-3. [1904, Cd. 1919]. Price 1s. 10d.

*The above Parliamentary Publications, and copies of the Official Journal of the Department, can be ordered from Mr. E. Ponsonby, Grafton-street, Dublin, the Government Sale Agent in Ireland.*

Ireland—Industrial and Agricultural. 500 Pages. Profusely illustrated. 5s.; by post, 5s. 7d. Messrs. Browne & Nolan, Nassau-street. Dublin; and all Booksellers.

## OFFICE PUBLICATIONS.

Register of Thoroughbred and Agricultural Stallions.

Bulletin No. 1:—*Miscellaneous Series*—Report by the late Professor Nocard (*of the French Ministry of Agriculture*) on the Mortality Among Calves in Munster

“ ” 2 “ “ Co-operative Agricultural Credit in Germany and Switzerland.

“ ” 3 “ “ “The Annual Audit.”

“ ” 4 “ “ The Estimation of Fat in Milk and Cream.

“ ” 5 “ “ The Bacon Curing Industry of Denmark.

“ ” 6 “ “ The Best Methods of Organisation for Agricultural Co-operation and Credit.

“ ” 7 “ “ Report on Co-operative Agriculture and Rural Conditions in Denmark.

“ ” 8 “ “ Some Features of American Education.

“ ” 1—*Science and Art Series*—

School Balances:—Their construction and some hints as to their selection and use.

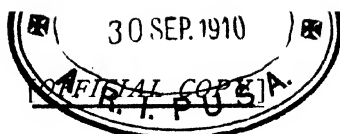
“ ” 2 “ “ The Spectrometer:—Its construction, adjustments and uses.

“ ” 3 “ “ The Quadrant Electrometer:—Its construction and uses.

The *Journal* of the Department. (Quarterly). Nos. 1, 2, 3, 4—making Vol. I., August, 1900, to May, 1901—have been issued, but these numbers are out of print. The price of the issues beginning with No. 1, Vol. II.—Nos. 1, 2, 3, and 4, each of Vols. II. III., and IV., and Nos. 1 and 2 of Vol. V. have now been issued—is Sixpence per copy, exclusive of postage, or post free for a year, Three Shillings.



Vol. V.



No. 2.

DEPARTMENT OF AGRICULTURE

AND

TECHNICAL INSTRUCTION FOR IRELAND.

# JOURNAL.

Tillage versus Grazing—Fruit Growing in Ireland—Barley Growing in Ireland—  
Barley Experiments, 1904—Art-Trade Schools in Germany—Sprouting Seed  
Potatoes—The Manufacture of Alcohol from Potatoes—Moulds on Butter—Flax  
Seed, 1905—Official Documents—Notes and Memoranda—Statistical Tables.

FIFTH YEAR.

No. 2.

JANUARY, 1905.



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## NOTICE.

*Communications respecting the literary contents of this JOURNAL should be addressed to the Superintendent of Statistics and Intelligence Branch, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin.*

*Communications respecting Advertisements should be addressed to ALEX. THOM & Co. (LIMITED), MIDDLE ABBEY-STREET, DUBLIN ; or to LAUGHTON & Co. (LIMITED), 1 ESSEX-STREET, STRAND, LONDON, W.C., and not to the DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.*

## TILLAGE VERSUS GRAZING.

In the problem "Tillage versus Grazing" the vital factor is money. There may be other factors, but

**A Money Problem.** their bearing is less direct. It is contended,

for instance, that tillage employs a greater number of people; but that contention carries little weight with the farmer. The question for him is: Which is the more profitable? If it be tillage, well and good; but if it be grazing, then he cannot afford to follow an unprofitable calling merely that his neighbourhood may be more thickly populated. As with other men, his own living is his first concern. The natural way to settle the question would be to get a number of farmers' balance sheets, and, setting in contrast the profits from grazing and tillage, find the solution by simple arithmetic. But farmers, unfortunately for themselves, have no dealings with balance sheets, and we are compelled to revert to such a system of estimations as will meet the demands of the case as closely as possible. Of such systems we are restricted to two. We can imagine a farm of some definite size quality and commercial position, and either estimate how much it will return when grazed and when tilled, or, having estimated how much an acre of pasture and an acre of each individual tillage crop will return, work out the nett return for the entire farm. Of the two systems the latter is to be preferred, because it gives information not only as to the returns from the farm as a whole, but also as to which are the most profitable crops. For example, if oats, turnips, barley and hay, grown in rotation, leave respectively £3, £4, £1, and £2, the nett return is £2 10s.; but turnips are the most profitable crop.

Some points in the cropping estimates, which will be found on pages 220-223, must be made clear at the outset. In the first place, they must be

### **Framing the Estimates.**

normal with regard to every one of the four great factors—land, labour, capital, and management. The land must be normal in quality and in commercial position; labour and wages, buildings, drains, implements, stock and other capital must all be normal, as must also the ability of the management; and, since they are the chief causes of

varying returns, the factors requiring special attention are the quality and position of the land and the ability of the farmer. One acre of land might produce a crop of turnips worth £5 while another might produce a crop worth £20, and a crop worth £20 in one part of the country might be worth £30 in another. Given also the same land labour and capital, one farmer might raise a crop worth £25 an acre where another could only raise a crop worth £10: the result of different ability. Abnormalities such as these must be eliminated.

A glance at the estimates will show that there are complications among crops raised in rotation that have to be allowed for. The fact that crops are grown in rotation and that some are manured while others are not raises the question: How much ought to be charged against the crop to which the manures are applied and how much to the crops succeeding? This has been considered in the estimates; as has also the fact that crops coming after pasture are benefited by the fertility it has accumulated.

Another question of some difficulty is: Should the costs of tillage be spread over all the crops in the rotation; and, if so, with what proportion should each crop be charged? The principle that the costs of tillage should be spread over the rotation cannot but be admitted; the difficulty is: in what proportion? In view of the difficulty of fixing the proportion, and, as the effect of applying the principle to the estimates would be only to drive the lowest paying crop (temporary pasture) still lower and the highest paying crops (roots) still higher, the point has been left out of account.

To get a clear comparison between tillage and grazing, any further returns the farmer may earn through  
**A Clear Comparison.** stock-keeping are not considered for the present. Pasture is, therefore, valued at what it could be let for grazing—to the farmer himself for that matter—tillage crops consumed on the farm at their feeding value on the farm and crops sold off the farm at their value “free upon rail.” Should stock-feeding, whether on pasture or tillage, be found to modify the returns from each, the necessary alterations can be made afterwards.

In case objection may be taken to the estimated weights and values of the tillage crops, it may be stated that for the conditions assumed they are not over-estimated. Potatoes and turnips may

be taken as examples. Seven tons of potatoes, large and small together, are over the average for Ireland according to the statistics collected for the Department of Agriculture and Technical Instruction. But seven tons are not too large a crop for good cultivation and management upon average land. Ten shillings may seem a large price for a ton of turnips, but turnips at ten shillings are cheaper than most of the foodstuffs at the farmer's disposal.

So far as the main question before us is concerned, the figures

**Temporary Pastures  
Unprofitable.**

at the bottom of the columns in the estimation tables are sufficient argument. But the most striking result is the extraordinary position taken by temporary pastures. Only fourteen shillings and sixpence are left to meet rent, tenant right and the claims of the farmer's pocket. Remembering that temporary pastures were not charged with any share of the costs of tillage, is there anything at all in their favour? Ought they to be retained? If pastures are a necessity, ought they not rather to be permanent? The suggestion that temporary pastures are unprofitable is so strongly against prevalent agricultural opinion that a criticism of this opinion is necessary. During the last two decades the tillage farmer has been lengthening his rotation chiefly by leaving down his temporary pastures for a longer time. For this his reasons have been mainly three, viz.:—i., That the practice prevents finger and toe in the turnip crop; ii., that it accumulates fertility for the next course of rotation; and iii., that it lessens the labour bill. To which contentions the replies are:—i., Have we not lime and an advancing knowledge of infectious disease with which to prevent finger and toe; and, if it is to be prevented by lengthening the rotation, have we not such crops as potatoes and mangels? ii., Have we not manures with which to restore fertility more profitably? iii., Are we to dispense with labour unless the diminished outlay is to bring in a larger profit? Does the manufacturer, when profits are falling but are still profits, diminish his output in order to increase his income? The attitude of farmers with regard to labour suggests that they take high wages and dear labour to be the same thing; whereas the experience in other industries has been that high wages mean efficiency and cheap labour, while low wages mean inefficiency and dear labour.



## CROPS UNDER ROTATION.

Or Mangels.				Or Potatoes.			
3.				4.			
		£	s. d.			£	s. d.
Ploughing, ...		0	8 0	Ploughing, ...		0	8 0
Cultivating, ...		0	5 0	Cultivating, ...		0	5 0
Weeding, ...		0	3 0	Weeding, ...		0	3 0
Harrowing and Rolling, ...		0	2 0	Opening Drills, ...		0	3 0
Opening Drills, ...		0	3 0	Seed, ...		2	10 0
Seed, ...		0	8 0	Planting, ...		0	3 0
Sowing, ...		0	1 0	Closing Drills, ...		0	3 0
Closing Drills, ...		0	3 0	Saddle Harrow, ...		0	1 6
Scutler, ...		0	3 0	Drill Grubber, ...		0	3 6
Singling, ...		0	8 0	Moulding, ...		0	2 6
Scuffler, &c., ...		0	4 0	Grubbing, ...		0	3 6
Hoeing, ...		0	2 0	Hoeing, ...		0	2 0
Lifting, ...		0	8 0	Moulding, ...		0	2 6
Carting and Storing, ...		1	7 6	Lifting and Storing, ...		1	5 0
				Sorting, ...		0	7 6
				Spraying, ...		0	12 0
				Carting Potatoes to Railway, ...		0	18 0
15 tons farm-yard manure, ...	£ s. d.	3	0 0	15 tons farm-yard manure, ...	£ s. d.	3	0 0
2 cwt. Nitrate of Soda, ...	1	0 0	—	1 cwt. Ammonium Sulphate, ...	0	12 6	—
2 cwt. Kalnit, ...	0	6 0	—	1 cwt. Potassium Sulphate, ...	0	12 0	—
4 cwt. Superphosphate, ...	0	12 0	—	4 cwt. Superphosphate, ...	0	12 0	—
Carting, &c., ...	1	0 0	—	Carting, &c., ...	1	0 0	—
	5	18 0			5	16 6	
Proportion to Mangels, ...		3	18 0	Proportion to Potatoes, ...		3	16 6
			1 7 0				1 7 0
			9 10 6				12 16 6
22 tons, ...		13	4 0	1 ton Small, ...	1	10 0	—
				6 tons Saleable, ...	15	0 0	—
			3 13 6				16 10 0
							3 13 6

annual value of the Tenant Right—the rest being the farmer's profits.

[Continued on next page.]

## COST OF RAISING VARIOUS

Third Crop—Barley.			Fourth Crop—Hay.		Fifth Crop—Pasture.	
5.			6.		7.	
		£ s. d.		£ s. d.		£ s. d.
Ploughing. ....		0 8 0	Share of Seed,	0 7 0	Share of Seed,	0 7 0
Seed, ....		0 12 0	Harrowing. ...	0 0 9	Chain Harrow,	0 1 0
Sowing, ..		0 1 0	Rolling, ...	0 1 0	Rolling, ...	0 1 0
Harrowing, ...		0 2 0	Weeding, ...	0 2 0	Weeding, ...	0 2 0
Rolling, ...		0 1 0	Cutting, ...	0 2 0		
Weeding, ...		0 2 0	Saving, ...	0 8 0		
Harvesting, ...		0 8 0	Carrying and	0 8 0		
Carrying and Stacking, ...		0 6 0	Stacking, ...			
Thatching, ...		0 2 0				
Threshing, &c., ...		0 9 0				
Carting Grain to Railway, ...		0 3 0				
Share of manures applied to root crops, ...						
(1) Fertility accumulated by Grass crops and handed on to the Oat crop, ...						
Interest on Working £ s. d.						
Capital, ... 0 6 0						0 7 6
Rates and Taxes, and Insurance, ... 0 3 0						(to be de-
Upkeep of Imple-						ducted.)
ments, ... 0 3 0						
Fences, Drains, &c., 0 2 0						
Proportion of Idle Time, ... 0 3 0						
Lime, ... 0 5 0						
Business and Ma-						
naging Expenses, 0 5 0						
			1 7 0	1 7 0	1 7 0	
Value of a Fair Crop—*			5 0 0	3 5 9	1 15 6	
150 stones grain, ... 5 12 6						
160 stones straw, ... 1 0 0						
			6 12 6	35 cwts. 5 5 0		
				After- 0 12 6		
				math. 5 17 6		2 10 0
Difference,† ...			1 12 6	2 11 9	0 14 6	

(1) NOTE.—The annual increment of accumulation decreases with time, but rather are set down at the same figure.

\* Barley is valued at the average between malting and feeding barley, viz. 9d.

† i.e., the "difference" left over to pay rent and to stand against the annual value

CROPS UNDER ROTATION—*continued.*

Sixth Crop—Pasture.		Permanent Meadow.		Permanent Pasture.	
8.		9.		10.	
	£ s. d.		£ s. d.		£ s. d.
Share of Seed, ...	0 7 0	Proportion of cost of laying down, ...	0 2 0	Proportion of cost of laying down, ...	0 2 0
Chain Harrow, ...	0 1 0	Weeding, ...	0 2 0	Labour at the rate of 2 men and 1 horse for 200 acres, ...	0 10 0
Rolling, ...	0 1 0	Chain Harrow, ...	0 1 0	Tools and repairing materials, ...	0 1 0
Weeding, ...	0 2 0	Fences, Drains, &c., ...	0 4 0	Rates and Taxes, ...	0 3 0
		Manure, ...	1 0 0	Slag and other manures, ...	0 5 0
		Cutting, ...	0 3 0	Business and other Expenses, ...	0 1 6
		Sowing, ...	0 12 0	Interest on Capital, ...	0 0 6
		Carrying & Stacking, ...	0 10 0		
		Rates and Taxes, ...	0 3 0		
		Interest on Capital, ...	0 2 6		
		Upkeep of Implements, ...	0 1 6		
		Managing and Business Expenses, ...	0 2 6		
	0 5 0				
	0 7 6 (to be deducted).				
	1 7 0				
	1 15 6		3 3 6		1 3 0
	2 10 0	45 cwt., Aftermath, 5 12 6 0 7 6	6 0 0		2 10 0
	0 14 6		2 16 6		1 7 0

than risk an over-statement of this decrease, the accumulations by first and second years' pastures a stone.  
of the Tenant Right— the rest being the farmer's profits.



Having determined the probable returns from tillage and from pasture on the assumption that the farmer merely raises the crops, the next question is: **The Returns from Grazing.** Can he add to his income by having those crops consumed by stock? And, if so, how much from tillage and how much from pasture? By assuming the land to be devoted to grazing entirely and then to tillage entirely, we shall get the sharpest contrast between the two systems. But there is grazing and grazing; and it would not be fair to the system in general to take as typical that kind of grazing which provides neither sufficient shelter nor sufficient food for the winter. To imagine such a system competing as a profit-earning concern with systems where even only rough winter food is provided is almost impossible: much more to imagine it competing with still more rational systems. We shall take the following examples as typical of grazing:—

- (a) Cows constantly pastured, but getting in winter either hay or rough pasture or both.
- (b) Cows treated as above, but getting in addition a small quantity of cake or grain during a portion of the winter.
- (c) Bullocks treated similarly to cows (a).
- (d) Bullocks treated similarly to cows (b).
- (e) Bullocks summer grazed only.
- (f) Bullocks summer grazed, but getting cake or grain in addition during the latter part of the summer.

(a) DAIRY COW, PASTURED.

		Return per Head.	Return per Acre.
	£ s. d.	£ s. d.	£ s. d.
Pasture, 2 acres, ... ..	5 0 0		
Rough pasturage for winter, or hay, say 1½ stones a day—30 cwts. at 2s. 6d., ... ..	3 15 0		
Attendance during the year, cost of milking, delivery of milk, and other incidental expenses, ... ..	1 15 0		
Interest on Capital, ... ..	0 12 0		
Insurance against death, sterility, abortion, &c., ... ..	0 12 0		
	11 14 0		
500 gallons of milk at 4½d., ... ..	9 7 6		
Calf, ... ..	2 0 0		
Manure (if hay be given), ... ..	0 5 0		
	11 12 6		
		0 1 6 (Loss.)	0 0 9 (Loss.)

## (b) DAIRY COW, GETTING CAKE OR GRAIN IN WINTER.

		Return per Head.	Return per Acre.
	£ s. d.	£ s. d.	£ s. d.
Pasture, ... ..	5 0 0		
Rough pasture or hay, ... ..	3 15 0		
Grain or cake, 2lbs. a day for 3 months—1½ cwts., ...	0 10 0		
Attendance, &c., ... ..	1 15 0		
Interest on Capital, ... ..	0 12 0		
Insurance, ... ..	0 12 0		
	12 4 0		
600 gallons of milk at 4½d. ... ..	£ s. d. 11 5 0		
Calf, ... ..	2 10 0		
Manure (if hay be given), ... ..	0 7 6		
	14 2 6	1 18 6	0 19 3

## (c) EIGHTEEN MONTHS' OLD BULLOCK, PASTURED.\*

		Return per Head.	Return per Acre.
	£ s. d.	£ s. d.	£ s. d.
Pasture, 1½ acres, ... ..	3 2 6		
Rough pasture or hay, 1 stone a day for 5 months— 1 ton, ... ..	2 10 0		
Attendance, ... ..	0 10 0		
Interest, ... ..	0 10 0		
Insurance, ... ..	0 2 6		
Original cost of Bullock, 7 cwts. at 25s.† ... ..	8 15 0		
	15 10 0		
Selling value after a year—11 cwts. at 27s. 6d., ... ..	£ s. d. 15 2 6		
Manure (if hay be given), ... ..	0 5 0		
	15 7 6	0 2 6 (Loss.)	0 2 0 (Loss.)

Pastured from Autumn to Autumn.

† NOTE.—The values assigned to cattle are also for average conditions and commercial position. They are higher probably than the prices in many remote places and lower than at or near the shipping ports. Disparity in prices is much more marked for live stock than for grain or other farm produce. The reason is that, when grain is sold, one factor only is the main consideration, while when stock is sold, quality, "condition," and weight enter into consideration. Until live stock are, in some way, graded according to quality and "condition" and then sold by ascertained weight, the farmer will remain at the mercy of the speculative dealer.

## (d) EIGHTEEN MONTHS' OLD BULLOCK,\* GETTING CAKE IN WINTER.

		Return per Head.	Return per Acre.
Pasture, 1½ acres, ... ..	£ s. d. 3 2 6	£ s. d.	£ s. d.
Rough pasture or hay—1 ton, ... ..	2 10 0		
2 lbs. of cake or grain a day for 5 months—2½ cwts.,	0 15 0		
Attendance, ... ..	0 15 0		
Interest, ... ..	0 10 0		
Insurance, ... ..	0 2 6		
Original cost of Bullock, 7 cwts. at 25s., ... ..	8 15 0		
	16 10 0		
Value after a year—11½ cwts. at 30s., ... 17 5 0	£ s. d. ... 17 5 0		
Manure (if hay be given), ... ..	... 0 9 0		
	17 14 0	1 4 0	0 19 2

## (e) WELL-WINTERED BULLOCK, SUMMER GRAZED.

		Return per Head.	Return per Acre.
Pasture, 1½ acres, ... ..	£ s. d. 3 2 6	£ s. d.	£ s. d.
Attendance, ... ..	0 6 0		
Interest (for 6 months), ... ..	0 5 0		
Insurance, ... ..	0 1 6		
Original cost, 9 cwts. at 27s. 6d., ... ..	12 7 6		
	16 2 6		
Selling value in Autumn—11½ cwts. at 30s., ... 17 5 0	£ s. d. ... 17 5 0		
Value of land for Sheep wintering, at 5s. an acre, ... ..	... 0 4 0		
	17 9 0	1 6 6	1 1 2

## (f) SIMILAR BULLOCK, SUMMER GRAZED AND CAKE-FED.

		Return per Head.	Return per Acre.
Pasture, 1½ acres, ... ..	£ s. d. 3 2 6	£ s. d.	£ s. d.
Grain and cake, 2 lbs. a day for 3 months—1½ cwts., ...	0 9 9		
Attendance, ... ..	0 7 6		
Interest (for 6 months), ... ..	0 5 0		
Insurance, ... ..	0 1 6		
Original cost of Bullock—9 cwts. at 27s. 6d., ... ..	12 7 6		
	16 13 9		
Selling value—11½ cwts. at 31s. 6d., ... 18 10 0	£ s. d. ... 18 10 0		
Manure from cake, ... ..	... 0 2 6		
Value of land for Sheep wintering, ... 0 5 0	... 0 5 0		
	18 17 6	2 3 9	1 15 0

\* Pastured from Autumn to Autumn.

Consider now the possible returns from consuming the produce  
**Returns from Stock-** of tillage. As with grazing, we shall con-  
**Keeping on Tillage.** sider several methods, viz.:—

- (a) Fattening well-pastured  $2\frac{1}{2}$  year old bullocks just off good pastures.
- (b) Fattening well-pastured  $1\frac{1}{2}$  year old bullocks just off good pasture.
- (c) Wintering  $1\frac{1}{2}$  year old bullocks off only fair pasture.
- (d) Wintering and fattening  $1\frac{1}{2}$  year old bullocks off only fair pasture.
- (e) Winter Dairying.

(a) FATTENING 30 MONTHS OLD BULLOCK.

	Daily Average.	Total for 13 weeks.	—	Return per Head.	Return per Acre.
	Lbs.	Cwts.	£ s. d.	£ s. d.	£ s. d.
Turnips, ... ..	112	91	2 5 6		
Oat straw, ... ..	10	3	0 16 0		
Decorticated Cotton Cake, ...	2	1½	0 11 6		
Oats or Maize, ... ..	4	3½	0 16 3		
Barley straw (litter), ... ..	4	3½	0 3 3		
Attendance, ... ..	...	...	0 6 6		
Interest on Capital (3 months), ...	...	...	0 4 3		
Insurance, ... ..	...	...	0 1 0		
Original cost—11 cwts. at 27s. 6d., ...	...	...	15 2 6		
			20 6 9		
Selling price—12½ cwts. at 32s., ...	...	20 8 0			
Value of manure, ... ..	...	0 17 6			
			21 5 6	0 18 9	1 3 4

(b) FATTENING 18 TO 20 MONTHS OLD BULLOCK.

	Daily Average.	Total for 13 weeks.	—	Return per Head.	Return per Acre.
	Lbs.	Cwts.	£ s. d.	£ s. d.	£ s. d.
Turnips, ... ..	84	68½	1 14 2		
Oat straw, ... ..	8	6½	0 13 0		
Hay, ... ..	2	1½	0 5 0		
Decorticated Cotton Cake, ...	2	1½	0 11 5		
Oats or Maize, ... ..	2	1½	0 8 2		
Barley straw (litter), ... ..	4	3½	0 3 3		
Attendance, ... ..	...	...	0 6 6		
Interest (3 months), ... ..	...	...	0 3 2		
Insurance, ... ..	...	...	0 1 0		
Original cost of Bullock—8 cwts. at 28s., ...	...	...	11 4 0		
			15 9 8		
Selling value—9½ cwts. at 33s., ...	...	16 1 9			
Manure, ... ..	...	0 15 0			
			16 16 9	1 7 1	2 0 6

## (c) WINTERING 18 MONTHS OLD BULLOCK.

	Daily Average.	Total for 26 Weeks.	—	Return per Animal.	Return per Acre.
	Lbs.	Cwts.	£ s. d.	£ s. d.	£ s. d.
Turnips, ... ..	84	137	3 18 2		
Oat straw, ... ..	8	13	1 6 0		
Hay, ... ..	2	3½	0 9 9		
Barley straw (litter), ... ..	4	6½	0 6 6		
Attendance, ... ..	...	...	0 13 0		
Interest on Capital (6 months), ... ..	...	...	0 5 0		
Insurance, ... ..	...	...	0 2 0		
Cost of Bullock—7 cwts. at 25s., ... ..	...	...	8 15 0		
			15 15 5		
Selling value—9½ cwts. at 27s. 6d., ... ..	...	£ s. d. 13 8 2			
Manure, ... ..	...	1 5 0	14 13 2		
				1 2 3 (Loss.)	0 17 6 (Loss.)

## (d) WINTERING, THEN FATTENING, 18 MONTHS OLD BULLOCK.

	Daily Average.	Total for 13 weeks.	—	Return per Animal.	Return per Acre.
	Lbs.	Cwts.	£ s. d.	£ s. d.	£ s. d.
Keep and other expenses as above in example (c), for 13 weeks.	—	—	3 10 3		
Turnips for 13 weeks more, ... ..	84	68½	1 14 2		
Oat straw do., ... ..	8	6½	0 13 0		
Hay do., ... ..	2	1½	0 5 0		
Decorticated Cotton Cake for 13 weeks more, ... ..	2	1½	0 11 5		
Oats or Maize for 13 weeks more, ... ..	2	1½	0 8 2		
Barley straw (litter) for 13 weeks more, ... ..	4	3½	0 3 4		
Attendance for 13 weeks more, ... ..	...	...	0 5 6		
Interest on Capital, do., ... ..	...	...	0 3 0		
Insurance do., ... ..	...	...	0 2 0		
Original cost of Bullock—7 cwts. at 25s., ... ..	...	...	8 15 0		
			16 11 10		
Selling value of Bullock—10½ cwts. at 33s., ... ..	...	£ s. d. 16 18 3			
Manure, ... ..	...	1 7 6	18 5 9		
				1 13 11	1 7 0

## (c) WINTER DAIRYING.

	Daily Average.	Total for 30 weeks.	—	Return per Head.	Return per Acre.
	Lbs.	Cwts.	£ s. d.	£ s. d.	£ s. d.
Straw, ... ..	10	19	1 18 0		
Hay, ... ..	4	7½	1 4 6		
Turnips, ... ..	84	157½	4 0 0		
Decorticated Cotton Cake, ...	2	3½	1 6 3		
Grain and Meals, ... ..	6	11½	2 17 9		
Barley straw (litter), ... ..	4	7½	0 7 6		
Attendance, milking, &c., ... ..			2 0 0		
Interest, ... ..			0 12 0		
Insurance, ... ..			0 12 0		
Five months' grass in Summer at 2s. 6d. per week, ...			2 15 0		
			17 13 0		
600 gallons milk at 6d., ... ..		£ s. d. 15 0 0			
Calf, ... ..		2 10 0			
Manure in Winter, ... ..		1 12 0			
			19 2 0		
				1 9 0	0 14 6

On page 218 it was arranged that, after the returns from Stock-keeping had been determined, the additions necessary to bring out the total results as between tillage and grazing would be made. In the following summary the contrasted columns bring out those total results :—

## SUMMARY OF RETURNS ON AVERAGE LAND PER STATUTE ACRE.

FROM CROP-RAISING ALONE.					
TILLAGE.			PASTURE AND MEADOW.		
Oats, ... ..	£ s. d. 2 5 10		Meadow Hay, ...	£ s. d. 2 16 6	
Turnips, ... ..	3 0 6		Pasture, ... ..	1 7 0	
Mangels, ... ..	3 13 6				
Potatoes, ... ..	3 13 6				
Barley, ... ..	1 12 6				
Hay, ... ..	2 11 9				
Pasture, 1st year, ... ..	0 14 6				
Pasture, 2nd year, ... ..	0 14 6				
FROM STOCK-KEEPING ALONE.					
TILLAGE.		GRAZING.			
Fattening 2½-year-old bullocks (3 months), ... ..	£ s. d. 1 3 4	Dairy cows, as ordinarily treated, ...	£ s. d. 0 0 9		(loss.)
Fattening 1½-year-old bullocks (3 months), ... ..	2 0 6	Dairy cows, better treated, ...	0 19 3		
Wintering 1½-year-old bullocks (6 months), ... ..	0 17 6	Bullocks, as ordinarily treated, ...	0 2 0		(loss.)
Wintering and fattening 1½-year-old bullocks (6 months), ...	(loss.) 1 7 0	Bullocks, pastured, and cake fed, ...	0 19 2		
Winter Dairying (12 months), ...	0 14 6	Bullocks, summer grazed only, ...	1 1 2		
		Bullocks, summer grazed, with cake added, ... ..	1 15 0		

That is to say: adding the crop-raising and stock-keeping results together, on a reasonably well-managed tillage farm of average quality and commercial position, the farmer can earn from seventy to ninety shillings an acre, whereas by grazing the same land forty-five to fifty shillings an acre can be earned only by the finest management. If we assume the rent and the annual value of the tenant-right together to be from 20s. to 25s. an acre, then the tillage farmer earns a profit of 50s. or more per acre, whereas the grazing farmer earns only half that sum or less. Or, separating crop-raising and stock-keeping, the position might be stated thus:—The farmer who tills makes a better living than he who does little else than watch the progress of his meadows and pastures; and the incomes of both may be increased or decreased by stock-keeping. It must be remembered, however, that prices vary more sharply for store and fat cattle than for any other ordinary agricultural product, and that, consequently, the producers of these are liable to periods of inflation and depression: the producer of “stores” to inflation, of fat to depression, or vice versa. Eliminating such variations, it is perfectly clear that the stock-keeper’s income is increased, whether upon tillage or upon pasture, when his animals are treated well, and decreased when they are treated badly. The most serious losses are incurred by the lack of sufficient and appropriate food and shelter during the winter. In the case of stock for the butcher, it may be noted that, when they are merely increasing in size, they may or they may not be profitable; they are so, however, when they are increasing in value per hundredweight as well. Possibly the most profitable method of producing beef for the butcher is to feed the stock highly from birth and sell them fat at eighteen or twenty months old. This method, however, has not been considered here.

A glance at the summary will suggest concentration upon root crops, potatoes, and oats, and upon better treatment of stock during the winter.

**The Crops to Grow.** If hay and pastures are a necessity, then they—the pastures at any rate—are most profitable when permanent. And still further: the experience of recent years has shown that by selecting more productive varieties, by using more manures, and by more careful cultivation, still larger and more profitable tillage crops may be produced. Permanent pastures and meadows may also be still further improved by manures, but in a smaller degree.

From the previous discussion some further problems arise.

Three may be taken as more important than most of the others, viz.:—(a) When is land too good to be tilled? (b) When is land too poor to be tilled? (c) What are the conditions necessary to tillable land being tilled with profit?

With regard to the first problem: Since the general costs of tillage are practically the same for all qualities of

**When is land too good to be tilled?** tillable land, the only additions to the costs of raising a crop on better than average land are the additional rent and the increased cost

of handling. If larger crops on better land will more than meet the additional rent, then the better land ought to be tilled. There is the difficulty, however, that all the usual tillage crops are not equally responsive to better land. Some may even reach their maximum production on land little better than the average. For instance: Mangels could be raised from 22 tons on average land to 45 or even 50 on the best land; but barley could scarcely be raised in the same way from 140 stónes to more than 300. The crop might be grown, but it might not be harvested. Thus, if the very best land, that is generally the highest rented land, is to be tilled, it must not be expected to yield the highest return unless the most suitable crops are selected. Giving over good land to an inappreciative crop is like sending a Clydesdale horse to haul the load of a Shetland pony. To elucidate the point, let us place in parallel columns the following data estimated as regards lands of varying quality from the average up to the best:—i., The probable crop on the average and on better soils; ii., the extra cost of growing this crop on better soils, *i.e.*, the extra rent and cost of handling; iii., the extra value of the crop; and iv., the extra profit or loss that may result. It will be seen that whereas some crops yield their maximum money return on average or slightly better land (barley, for instance), there are others (potatoes, turnips, and mangels, for instance) that reach their maximum on land of the highest, or almost the highest, quality. The best land, therefore, is only doing its best when it is growing these latter crops.\*

\* It is just possible that, for some crops, as land increases in value, less may have to be expended in manures. This point, of no very serious importance to the main issue, has not been considered.



ON AVERAGE LAND.			ON LAND RENTED AT 20s. MORE.					ON LAND RENTED AT 40s. MORE.					ON LAND RENTED AT 60s. MORE.				
	Crop.	Value.	Probable Crop.	Extra Cost: Rent and Hand-ling.	Extra Value of Crop.	In-creased Profit or Loss.		Probable Crop.	Extra Cost: Rent and Hand-ling.	Extra Value of Crop.	In-creased Profit or Loss.		Probable Crop.	Extra Cost: Rent and Hand-ling.	Extra Value of Crop.	In-creased Profit or Loss.	
Oat Grain, ...	140 stones,	£ s. d. 4 13 4	180 stones,	£ s. d. 1 2 0	£ s. d. 2 1 8	£ s. d. 0 19 8	220 stones,	£ s. d. 2 4 0	£ s. d. 4 3 4	£ s. d. 4 3 4	£ s. d. 1 19 4	240 stones,	£ s. d. 3 6 0	£ s. d. 5 4 2	£ s. d. 1 18 2		
" Straw, ...	210 stones,	2 12 6	270 stones,	1 2 0	2 1 8	0 19 8	330 stones,	2 4 0	4 3 4	4 3 4	1 19 4	360 stones,	3 6 0	5 4 2	1 18 2		
Turnips, ...	20 tons.	10 0 0	28 tons.	1 6 0	3 0 0	1 14 0	32 tons.	2 12 0	6 0 0	6 0 0	3 8 0	36 tons.	3 16 0	8 0 0	4 4 0		
Mangels, ...	22 tons.	13 4 0	28 tons.	1 6 0	3 12 0	2 6 0	34 tons.	2 12 0	7 4 0	7 4 0	4 12 0	40 tons.	3 18 0	10 16 0	6 18 0		
Potatoes, ...	6 tons, saleable.	15 0 0	8 tons.	1 12 0	5 0 0	3 8 0	10 tons.	3 4 0	10 0 0	10 0 0	8 18 0	10½ tons.	4 10 0	11 5 0	6 15 0		
" " small	1 ton.	1 0 0	1 ton.	1 12 0	5 0 0	3 8 0	1 ton.	3 4 0	10 0 0	10 0 0	8 18 0	1 ton.	4 10 0	11 5 0	6 15 0		
Barley Grain, ...	150 stones,	5 12 6	180 stones,	1 1 6	1 3 9	0 2 3	200 stones,	2 3 0	2 5 0	2 5 0	0 2 0	200 stones,	3 4 0	2 7 6	0 16 6		
" Straw, ...	160 stones,	1 0 0	190 stones,	1 1 6	1 3 9	0 2 3	220 stones,	2 3 0	2 5 0	2 5 0	0 2 0	240 stones,	3 4 0	2 7 6	0 16 6	(Loss.)	
Rotation Hay, ...	35 cwts.,	5 5 0	45 cwts.,	1 5 0	1 15 0	0 10 0	50 cwts.,	2 7 6	2 12 6	2 12 6	0 5 0	53 cwts.,	3 8 6	3 1 0	0 7 6	(Loss.)	
Aftermath, ...	—	0 12 6	17½	1 5 0	1 15 0	0 10 0	20½	2 7 6	2 12 6	2 12 6	0 5 0	22½	3 8 6	3 1 0	0 7 6	(Loss.)	
Meadow Hay, ...	45 cwts.,	5 12 6	55 cwts.,	1 5 0	1 5 0	—	62 cwts.,	3 8 6	2 7 6	2 7 6	0 1 0	65 cwts.,	3 10 0	2 17 6	0 12 6	(Loss.)	
Aftermath, ...	—	0 7 6	10½	1 5 0	1 5 0	—	12½	3 8 6	2 7 6	2 7 6	0 1 0	15½	3 10 0	2 17 6	0 12 6	(Loss.)	

Assuming the foregoing data to be approximately correct, it is seen that although some crops cease to yield a proportionately increasing return as the quality of the land improves, there are others that more than compensate. The conclusion, therefore, is: provided the proper crops are grown, the better the land the more certainly should it be tilled. And, since the consumption of pasture by stock is less profitable than the consumption of tillage crops, it follows that, if profits are the aim, the high-class grazing lands ought to be tilled. The matter may be put very shortly: Since the growing and consumption of tillage crops upon average land is more profitable than the growing and consumption of pasture, the growing and consumption of an increased tillage crop must be more profitable than the growing and consumption of a similarly increased pasture.

It therefore follows that no land is too good to be tilled: remembering always that appropriate crops must be grown. There may be land so stiff that cultivation, difficult at all times, is impossible in bad seasons and land on which a good seed bed is obtainable only in exceptional years. There may also be lands so studded with rocks and stones that they cannot be ploughed at all. Such lands, however, are out of the question: they are not tillable. The lands we refer to as never too good to be tilled are such as are responsive to good management and cultivation.

It should be remembered, however, that a farm or tract of land that is changed from grazing entirely to tillage entirely is changed from a half-season "single industry" of one kind to a half-season single industry of another. Single industries are dangerous: half-season single industries still more. Therefore, as a mere matter of commercial policy, it might be desirable that some high-class grazing lands should still be retained for summer beef production.

The second of the three problems is: When is land too poor to be tilled? On very valuable land the landowner's interest is large; on poor land it is small. On a large farm the farmer's interest is large; on a small farm it is small. As a farm decreases in size and quality, the interests of the owner and the farmer become smaller and smaller, until, when the farm is so small that the farmer is his own only labourer, the interests of the landowner and farmer are almost entirely eliminated: the interest remaining paramount being that of the labourer-farmer alone. So long as land is capable of satisfying this man's de-

mands, that is of paying for his labour and outlay, it may still be cultivated; so soon as it falls below this capacity it may not: since it is then yielding the labourer-farmer a smaller income than his labour would yield were it hired to some other employer. In the left hand column below are set down the bare costs—labour and general expenses—of producing each of the usual tillage crops. In the right hand column are set down the crops necessary to return those bare costs of production.

Approximate Costs of producing Crops on merely Cultivable Land.				Crops required to meet the mere Cost of Production.
			£ s. d.	
Oats, ... ..			5 0 0	100 stones of grain and 150 stones straw.
Turnips, ... ..			7 0 0	14 tons.
Mangels, ... ..			9 10 0	16 tons.
Potatoes, ... ..			12 15 0	4½ tons saleable, 1 ton small.
Barley, ... ..			5 0 0	100 stones grain and 100 stones straw.
Rotation Hay, ... ..			3 5 0	20 cwts. and aftermath.
Meadow Hay, .. ..			3 2 6	23 cwts. and aftermath.

It may be argued that, since the labourer-farmer tills less thoroughly and applies less manures than the left hand column of figures implies, he may be satisfied by smaller crops than those in the right hand column. Certainly; but by poorer cultivation and manuring, will he get even those smaller crops? Scratching a poor soil and throwing a few spadefuls of manure upon it may produce a crop; but thorough cultivation and manuring are much more likely to produce a crop that will yield a profitable return

The last question is: What are the conditions necessary for tillable land being tilled with profit? In examining the phenomena of production, the older generation of economists concluded that there were three primary agents—land, labour, and capital. To these a younger generation added an important fourth, variously and somewhat indefinitely named business ability, management, shrewdness, thought, brains. Another agent must still be added which is antecedent to the other four, viz., the desire or, rather, the will to produce. If a farmer is perfectly satisfied with the comfortable income he derives from several hundred acres of grazing, there is more than convincing required that he should do better. He needs to be induced, perhaps to be impelled, to develop himself and his farm. That accomplished, then the other elements come into play.

Of three of the four elements the successful agriculturist has generally realised the importance. He has realised that the indefinite element of the modern economist is vital to successful production. He has realised that without capital, without buildings, shelter, implements, manures, drains, and suitable stock, he is impotent. He has realised also the difference between dissipating his capital on a large holding and concentrating upon a small. He has even realised the advantage of an increased turnover. But the farmer, as a rule, has not yet learned the value of educated dexterous and efficient labour. Nor has he learned that labour of that kind can be bought only by good wages, domestic comfort, and the prospect of higher employment, even a farm. Other industries have learned these things and have drawn away those that should have been the farmer's most efficient workmen. Already in some parts those other industries are turning their inefficient workmen back again upon the farmer. And all the farmer has to do is to realise that a good workman needs a good reward and that a good workman is in the end the cheapest. It is scarcely necessary to point out that tillage gives constant employment to the farmer and to the labourer, and that, consequently, both are no longer casual but permanent and, therefore, efficient workmen.

It only remains to state that the greater part of this paper has already been submitted to the criticism of a number of agriculturists deeply interested in the problems under discussion. It does not follow, however, that every estimate and every argument is correct. The writer will, therefore, be pleased indeed to receive criticisms not only as to the principles evolved, but also as to the minutest details.

JAMES WILSON.

## FRUIT GROWING IN IRELAND.\*

The Department of Agriculture and Technical Instruction for Ireland, in continuance of its efforts to foster and encourage the fruit-growing industry in this country, held a Show and Conference at Ballsbridge, Dublin, on the 19th and 20th October. The Show, which received the support of all classes, was an unequivocal success, and exhibits were sent from all the chief fruit-growing districts in Ireland. A report and a criticism of the exhibits appears on pp. 253 and 254.

The Department took the favourable opportunity which the Show provided to hold a Conference of those interested in the fruit-growing industry. The Conference was presided over by the Right Hon. Sir Horace Plunkett, K.C.V.O., Vice-President of the Department.

### SIR HORACE PLUNKETT'S ADDRESS.

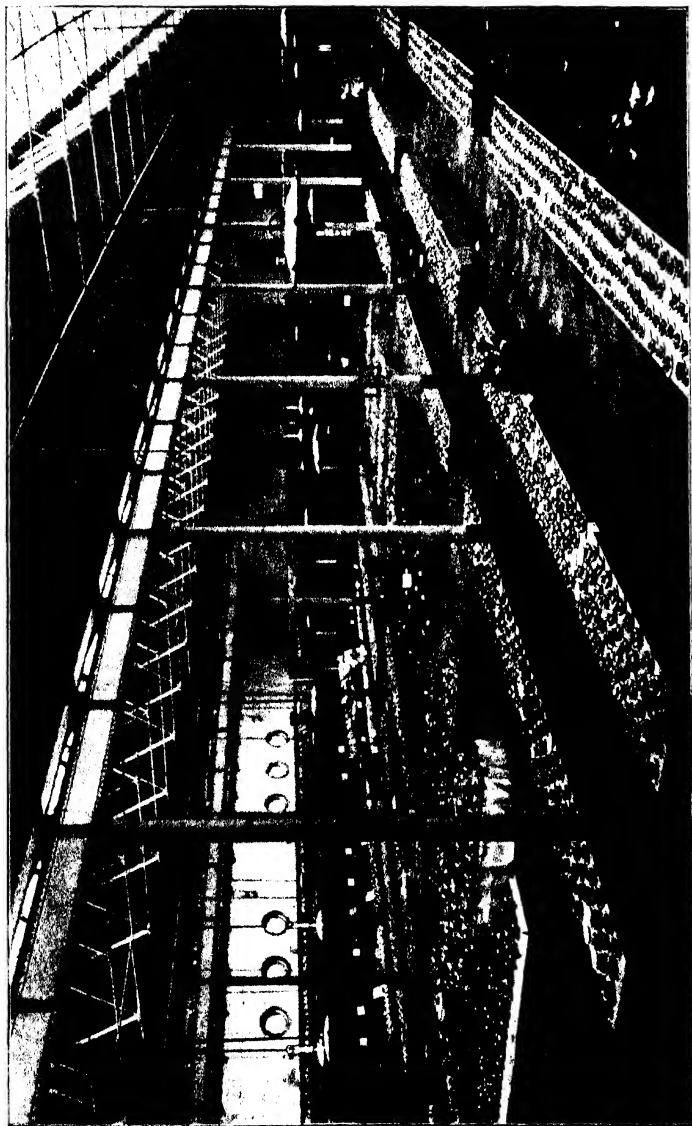
The CHAIRMAN, in the course of his address, said:—As Vice-President of the Department of Agriculture and Technical Instruction I have asked you to meet my colleagues and myself here to-day, and to confer with us upon the steps to be taken to develop an important industry upon a national scale. Towards the fulfilment of this purpose the exhibition in these premises, kindly lent to us by the Royal Dublin Society, has amply proved that nature is willing to do her part. It remains for us to show that we are prepared to do ours.

### RESPECTIVE FUNCTIONS OF STATE AID AND PRIVATE ENTERPRISE.

It will be hardly necessary to tell such an audience as this that the part which any Government can or ought to play in the development of industries is but small as compared with that which belongs to private enterprise. But when, as in this case, a national industry depends for its initiation upon the combined efforts of many persons and upon the reconciliation of many interests; when, further, it is in its nature one which must be conducted on a large scale in order to be profitable, it becomes evident that unassisted private

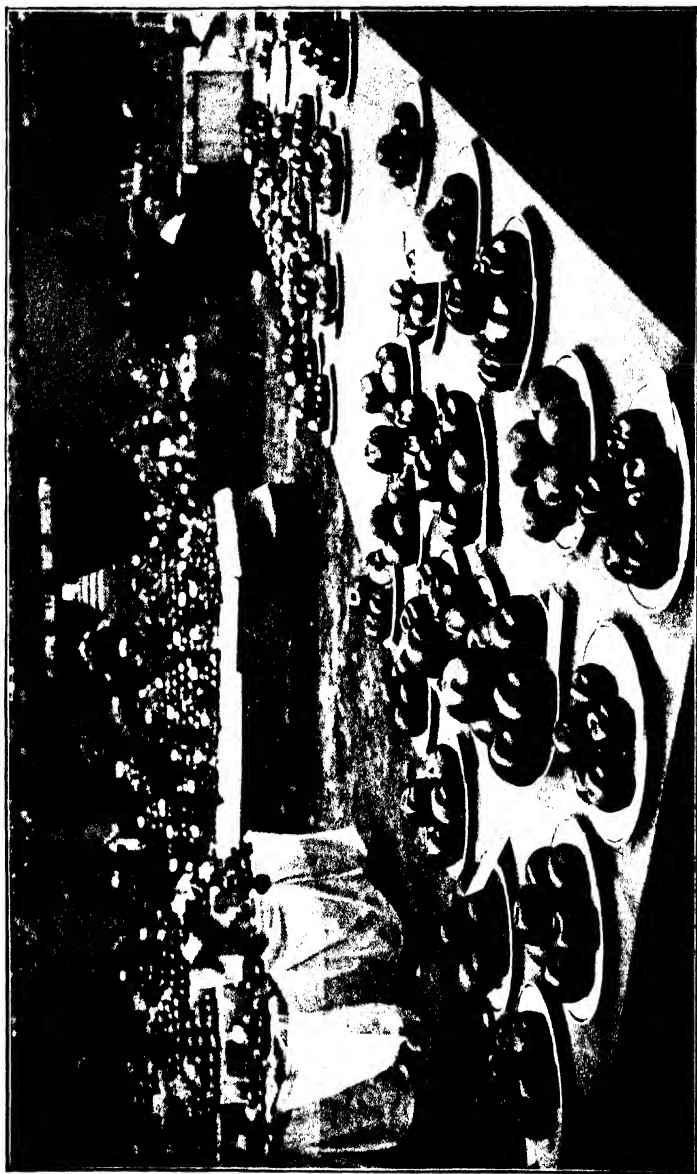
\* See also an account (*Journal*, Vol. III., No. 2, pp. 268-271) of a Fruit Show and Fruit Culture Conference, held at Cork, in October, 1902.

DUBLIN SHOW OF IRISH GROWN FRUIT, 1904.



1. General view of Exhibits on Ground Floor.

DUBLIN SHOW OF IRISH GROWN FRUIT, 1904.



2. Fruit grown under auspices of the Department near Dublin

enterprise cannot grapple with the practical problems involved. When, in such conditions, our objective is the building up of an important national industry it is the recognised function of such a Department as this, which has no private end to serve, to use the resources at its command for overcoming the difficulties incidental to the initial stage. At any rate, the Department has, during the initial stage of its own work, steadily pursued the necessary inquiries and conducted the necessary experiments in order to qualify itself to discharge what it conceived to be its proper function in the development of the hitherto sadly-neglected industry of fruit growing in Ireland.

#### THE SIX FACTORS IN THE PROBLEM OF FRUIT GROWING.

I must now explain as briefly as I can the Department's scheme of development and the exact stage at which we have arrived.

Before we could estimate our chances of success in promoting this industry we had to take into account six main factors in the problem, namely—soil, climate, market, transit facilities, efficiency in production, and economy in distribution. The soil, taken as a whole, is favourable. The climate, while very suitable for certain kinds of fruit, leaves much to be desired, but, although I sometimes think the Department is not held altogether blameless in the matter, I fear we cannot effect any improvement in this factor. As for market we are the nearest suppliers to the best market in the world. In transit facilities it is true that many countries have the advantage of us. Our own Great Northern Railway Company, which has some rapidly-developing fruit districts tributary to its system, has met the Department very fairly in helping fruit growers to market their produce. The time has not yet come to criticise the terms offered by other railways, because fruit growing along their lines has not reached a stage where they could be expected to establish a special rate. Indeed, the Department is not yet in a position to say exactly what rates the industry can afford to pay. So you see, gentlemen, the Department had to concentrate their energies on the two remaining factors. We had, firstly, by every means in our power, to work for an improvement in the methods, and for a great increase in the volume of fruit production; and secondly, within the somewhat narrow limits of Government interference, to aim at a more economic disposal of the product.



### FRUIT GROWING FOR DOMESTIC CONSUMPTION.

I take, first, the efforts of the Department to promote fruit growing, and the general conclusions at which they have arrived as regards future development. When you have heard the whole case stated you will probably agree with me that this Conference will most usefully discuss the production of fruit for sale in the markets of Great Britain and Ireland. The Department, on the other hand, had to concern itself quite as much with the cultivation of fruit as a much needed addition to the dietary of both the agricultural and artisan classes. Any variation on potatoes and cabbage in the plots attached to their cottages and homesteads is the rare exception. In this matter the influence of Boards of Guardians would be of material assistance. These plots might at a small expenditure be suitably fenced and planted with a variety of fruit and vegetables, the produce of which would form not only a valuable adjunct to the food of the family and help to lessen expenditure on imported food-stuffs, but would also provide a pleasing and elevating occupation.

### METHODS OF PROMOTION EMPLOYED BY DEPARTMENT AND THE COUNTY COUNCILS.

That fruit can be successfully grown for the purpose of raising the standard of living of our workers admits of no doubt whatever. The only question is, how such fruit growing can best be encouraged. The Department have received much advice on this point, the favourite recommendation being that they themselves should fence and plant the cottage plots. Those who tender this advice appear to forget, among other considerations, that fruit cultivation does not end with the planting of the trees; the owner, if he wishes to obtain a profitable crop, must carefully watch and intelligently plant. The chief problem is how to arouse the interest of the owner of the plot; for without some degree of enthusiasm in the work it is impossible for anyone to grow fruit even on the smallest scale. Slow and uphill though the work may be, there is only one way of promoting it among farmers and cottagers, and that is by a system of instruction such as is now provided by a large number of County Committees working in conjunction with the Department. The removal of this hindrance by the training of Irish teachers for the work was the Department's first concern, and—thanks to the new spirit in the country—much progress has been

made in this direction. At the Horticultural School which we established at the Albert Agricultural College, Glasnevin, a number of horticulturists have been trained, and are now at work under County Committees. Rapid progress must not be looked for until these teachers increase in number and gain experience, when the advantages of fruit growing will come to be more widely realised, and the desired improvement will follow.

To further encourage fruit growing and cottage gardening the Department and the County Committees have among their numerous schemes a system of prizes for those who achieved the greatest success in carrying into practice the teaching of the Horticultural Instructors. In prizes for the best-kept small holdings due consideration will be given to the state of the fruit and vegetable garden.

#### COMMERCIAL FRUIT GROWING. PRESENT STATE EXAMINED.

I come now to the question of commercial fruit growing—that is, fruit growing for sale in the markets of Great Britain and Ireland, upon which we particularly want the advice of this Conference. The Department's inquiry into this subject began in the first year of their operations, when they sent experts to inspect what had been done by farmers in the North of Ireland. The reports of these experts bore excellent testimony to the industry and enterprise of farmers in many parts of Ulster. Though the soil and climate, there, are not the best in Ireland, the Northern farmers have succeeded in building up a fruit-growing industry, which is not only a monument to their perseverance, but an object-lesson to the rest of the country, and an encouragement to the Department to make an effort to develop fruit growing in other parts of Ireland. Take as an example these figures which have come to our notice. From the single station of Anaghmore, County Armagh, the consignments of strawberries have risen by steady annual increases from 100 tons in 1898 to 700 tons in the current year. £20 a ton is not an excessive estimate of the price realised to the growers—that is, £14,000 distributed round that station. It is indeed largely owing to the success of these Northern fruit growers that the Department are encouraged to hold the show, and it is hoped that those who attend from the North will not be backward in giving us the benefit of their advice and experience. We, Southerners, have individuals of whose achievements we are proud, and I think Ulster would find it difficult to beat the record of the strawberry patch owned by Mr. Heatley, of Dargle Road, Bray. On 1 rood 17 perches (statute)

1 ton 2 quarters  $24\frac{1}{2}$  lbs. was produced this year and sold at an average of 1s.  $2\frac{1}{2}d.$  per lb. I have gone carefully into the accounts and find that the net revenue for this patch was £126. But here I am dealing with communities rather than with individuals, and I must admit that the fruit-growing districts of Ulster have so far given a fine lead to the South and West.

Following this inspection of fruit-growing in the North, the Department next turned their attention to the conditions in other parts of the country by means of a system of pioneer lectures and local inspections. To further learn the possibilities of the country we decided, on the occasion of the Cork Exhibition, in 1902, to hold a fruit show in which classes were provided for growers from the four provinces. Both the results of the inspection and the excellence of the exhibits at that show considerably strengthened the belief that fruit growing, if properly organised, might be made a source of revenue to farmers in other parts of the country as well as in Ulster. Visitors to the Cork Show informed us that the quality of the fruit exhibited greatly exceeded their expectations, and that, if properly marketed, remunerative prices could be obtained for it. By these means we have gained a good deal of useful information as to what is practicable in commercial fruit-growing.

#### CLASSIFICATION OF COMMERCIAL FRUITS. TREE AND TOP FRUITS.

Of trees and top fruit, apples, plums, damsons, pears, and cherries seem to be the only fruits worth special mention. Apples are, of course, our chief stand-by. They can be grown almost in any district where the whitethorn grows well. The cooking varieties appear to suit the North of Ireland best, while in the South and West the very choicest dessert apples can be grown to perfection. Visitors to the Show will have noticed the finish and colour of the fruit grown in Counties Clare and Kilkenny. Plums seem to do best on the limestone. They are mostly planted on the outskirts of orchards, or between apple trees. Liability to injury from frost when in blossom seems to be their chief defect. Damsons, some experts would put before plums in the order of importance, but, at present, in the view of these authorities, they are used too much as hedges for sheltering more dignified fruits. Pear-growing in this country seems to be a lost art. If it is to be revived, I am told Kilkenny is a most favourably-situated county for an experiment with new plantations; while north of Dundalk it is hardly possible to grow them at all. I remember as a school-boy I thought Irish pears hardly worth stealing. Cherries are a

good paying crop, but must be grown in large quantity to be remunerative, as they have to be specially policed from birds when they begin to colour.

#### BUSH AND BOTTOM FRUIT.

As regards bush and bottom fruit, strawberries, in the growth of which some Irish successes have already been mentioned, are the most important crop. Raspberries largely grown in the neighbourhood of Drogheda are not only consumed fresh in fair quantities in Dublin and Belfast, and manufactured in Belfast, Richhill, Portadown, Drogheda, and Dublin, but are also shipped in greater quantity to Liverpool and Glasgow. Black currants have, owing to the ravages of an insect called "The Black Currant Mite" in Great Britain, been one of the best-paying small fruits in Ireland for the past three years. I fear that even if we armed our Portal Veterinary Inspectors with microscopes it would be difficult for the Department to check the already-commenced invasion of these enemies, but intending planters should be very cautious about the purchase of their bushes, and should get a guarantee that they are free of the mite when purchased. Our Inspector reports that black currants do particularly well along the Blackwater Valley in County Waterford, and also at Foynes in County Limerick and in County Wicklow.

Gooseberries, as we all know, are a very accommodating, hardy fruit. They can be grown in almost any good ground and sold either green or ripe. They are good travellers, and are easily preserved. For red currants there does not seem to be a demand proportionate to the importance of red currant jelly among the mutton-eating public. Perhaps the flavouring and colouring of the saccharine substance has more to do with the laboratory than the garden.

These notes, I think, fairly represent in substance the result of the Department's inquiries. I should say that the piece of advice which has been most impressed upon me by the best experts in Irish fruit-growing is the necessity of renewing orchards and not growing too many varieties. I am afraid a large proportion of Irish apple trees have nothing to commend them except their venerable age, and simply cumber the garden.

Just one more item in the Department's fruit-growing operations needs a word of mention. Our farmers want practical demonstration that the advice given upon the information we have acquired can be profitably followed by their own class in their own circumstances. So we have arranged for three groups of 20

farmers each, and one group of 15 farmers, in the following districts:—Tagoat (County Wexford), Piltown (County Kilkenny), Newmarket-on-Fergus (County Clare), and Clonakilty (County Cork), respectively to carry on an important experiment for us. Each farmer cultivates an acre of ground approved by the Department. We supply the trees and the services of an expert for each group. The farmer has to fence the plot, do all the labour upon it; and when the time comes to market the fruit the Department will assist in finding a market, and will also pay half the cost of carriage. The arrangement is to continue for five years. The objects of this practical experiment and the extent to which it will guide not only the Department but the County Committees in such horticultural developments as may be undertaken in the future are obvious, and need not be elaborated. I think you will see in this story of the Department's operations, in which they have had the advantage of cheerful co-operation from the County Committees, farmers and others interested in the advancement of our rural life, that Ireland is not merely marking time pending the development of this great industry.

#### THE CHIEF FACTOR—DISPOSAL OF IRISH FRUIT.

I pass now to the other factor in our problem—the factor, I may add, which I am convinced is the central and vital one for our consideration—the preparation of our product for the market and its economical distribution therein. We have conducted inquiries with regard to the sale of Irish-grown fruit in both the Irish and British markets, and everywhere it was the same tale—Irish fruit was of excellent quality, but it had not met the conditions of the modern market—it was not consigned in a form admitting of rapid and cheap distribution in fresh condition. In other words, it was neither well graded nor well packed. I have purposely avoided any pronouncement on the transit facilities at present existing. Were I a benevolent despot I frankly admit that I would, at this stage, far rather coerce Irish producers to prepare their product for transmission to the market than coerce railways to lower rates upon consignments thoughtlessly and carelessly tumbled on to a railway platform in the apparent expectation that they will look all right at the other end of the journey. Small consignors must always be at a disadvantage as compared with large; but we must learn to overcome this difficulty in fruit as in other commodities by co-operation. An expert told me the other day of a calculation that he had made, which showed that a fruit salesman's time was worth to him in the market a shilling

a minute. It was hardly to be expected that he would give the same attention to irregular, ill-assorted, badly-packed small parcels of fruit as he would to large, regular consignments, which with a-tenth of the trouble would yield him ten times the commission. I have in my mind very clearly the steps which must be taken to overcome the disadvantages of the small consignor. But first we have to do two things of paramount importance which this Show and this Conference may at any rate bring into public prominence, and there can be no cessation of our efforts until these two ends are attained. We must have an officially recognised classification of Irish fruit, and we must bring about an agreement between the producers and the salesmen as to the most advantageous packages to be used in the business. The establishment of a brand under Departmental control and a system of grading analogous to that which prevails in the Cork Butter Market, and which, under other conditions, was of enormous value to the butter trade of the South of Ireland, is a question for the consideration of which the time is perhaps not yet ripe.

#### DISPOSAL OF FRUIT NOT SOLD FRESH.

No less important and no less difficult is the question of the most profitable method of disposing of fruit which cannot be marketed for immediate consumption. The fruit which we can grow in this country out of doors may be roughly divided into three classes, the first for sale in the fresh fruit markets, the second for drying or preserving, and the third for making what is technically known as pulp, which I believe is an important part of the raw material used in the manufacture of jam. Now it is essential to the economic success of fruit-growing on a commercial scale that provision should be made for dealing with the portion of the crop which cannot find an outlet for immediate consumption. The Department cannot, of course, conduct industries itself on a commercial scale, but it has felt justified in trying important experiments at Portadown and Drogheda in drying and preserving various fruits and vegetables, in making a certain amount of pulp, and also in cider-making. It is our policy, if we can show that these factories can be worked at a profit, to sell them to anyone who will carry on the industry commercially, as soon as we have educated local workers. The products of these experiments can be seen in the exhibition. We have already induced two firms to start the bottled and tinned fruit manufacture, and have assisted two cider makers to start that industry.

These experiments have a special value to the peasant class in another connection. They will, we hope, find a profitable market

for the vast quantities of wild fruit which now run to waste, but for which, again, co-operative organisation will be required in order to have the packing and handling conducted economically.

Lastly, the Department is engaged on some experiments in cold storage. Personally I have a doubt as to whether cold storage is indicated by the conditions, as it seems to place us on a level with distant competitors.

At too great length, I fear, but I hope without unnecessary elaboration or detail, I have now placed you in possession of the salient facts relating to the preparatory work conducted by the Department in order to facilitate the inauguration of what we are fairly convinced is a perfectly feasible and indeed not by any means problematical industrial development. Before I conclude I should like to say a word upon the lessons which can be learned at this exhibition, and which have an important bearing on the main suggestions which I have ventured to put forward in this address. By the unanimous consent of the experts who have been kind enough to judge and report upon the two and a-half thousand exhibits sent in by over three hundred exhibitors, this Show has not only beaten all previous records in Ireland, but will take a high place both as regards quality and quantity among the fruit shows of the United Kingdom. What adds to the significance of this achievement is that, unlike the big annual Shows of England and Scotland for which gardeners prepare months beforehand by specially manuring and pruning the hopeful trees, our Show was a surprise competition of which we designedly gave the shortest notice, because we did not want to ascertain what professional gardeners could do under the stimulus of a national competition, but what they were doing in the present stage of fruit development in Ireland.

#### THE WELL-TO-DO FRUIT GROWERS.

And here I would anticipate a possible criticism of these exhibits. It may be said that the best of them, and indeed the larger number of them, are the products of the rich man's fancy rather than the poor man's economy. Now, if this be true, the Department, which of course must look chiefly to the interests of the more numerous and less wealthy class, do not regret the fact. What we aim at is a trade of sufficiently large dimensions and conducted in its higher branches by a sufficient number of well-circumstanced growers to admit of a regular supply to the fresh fruit markets of good Irish fruit of uniform quality. These same producers, we hope, will be suppliers of raw material both to the

second and the third classes which I have named—to bottlers, canners, and jam-makers. The small growers and even the cottagers with their too-little cultivated plots will find an outlet for a portion of their produce in the markets which can thus be opened to Irish fruit. They will have to avail themselves of all the resources of co-operation, which is, perhaps, of more vital importance to fruit growing than to any other rural industry, except possibly butter making. And I would submit, gentlemen, that so far from depreciating the value of these industries because the predominant part may be played in their development by the landed gentry, we should cordially welcome into the widening arena of Irish industry existing or former landlords who desire to remain in the country and to give their capital, their enterprise, and their educational advantages to the development of its resources.

#### THE NEED FOR UNITED EFFORT.

In conclusion, let me again remind you that the industry we must develop has to be carried on on a large scale, otherwise we cannot gain for it a position of advantage in the market. Furthermore, it cannot prosper unless it is well conducted in all its parts. It is a chain the strength of which is but the strength of its weakest link. Growers, carriers, salesmen and manufacturers have all their part to do well before the desired consummation can be reached. We have passed now through the preliminary stage of investigation and experiment. The experiments are not, as I have told you, yet complete; but they have gone far enough to enable us to take up seriously the problem of reorganising the trade as a whole. If those who have helped us in the past will continue their assistance, the Department will do its utmost, in its position of a disinterested public servant, to further the efforts of the many classes concerned to do on a large commercial national scale what—as few of us perhaps realised until we visited this exhibition—Ireland has done so well in a small and tentative way.



On the conclusion of the Vice-President's address the Conference was formally opened, and speeches were

**Discussion.** made by Messrs. F. W. Moore, Toler Garvey, George Henry, Sherlock, Barker, Emptdage,

Col. Everard, Father O'Kieran, Alderman Cole and others.

MR. F. W. MOORE said—The main question we have met to discuss is: Can fruit be grown for profit in Ireland? Those who have been through the exhibits in the hall outside, and who take into consideration the fact that it really does not represent the best possible exhibition of Irish-grown fruit, will give an unqualified YES to that question, at least so far as apples are concerned. If the answer be an unqualified Yes, to put the matter on a really commercial basis there must be something more than merely leaving the apples to grow. This raises the question of the standard and quality of the apples grown. In producing apples there are four important points to be considered, namely, the cultivation, grading, packing, and marketing of the fruit, and unless these four points are taken into careful consideration and attended to there will be little commercial success in growing apples. The North of Ireland has been mentioned in special terms and lauded with much praise; deservedly so. They were pioneers, and had as pioneers many difficulties to overcome. But I would ask you as practical men not to take what is being done in the North as perfection. I trust that in a few years we will see not only in the North but in the rest of Ireland much better work than is at present being done in the North.

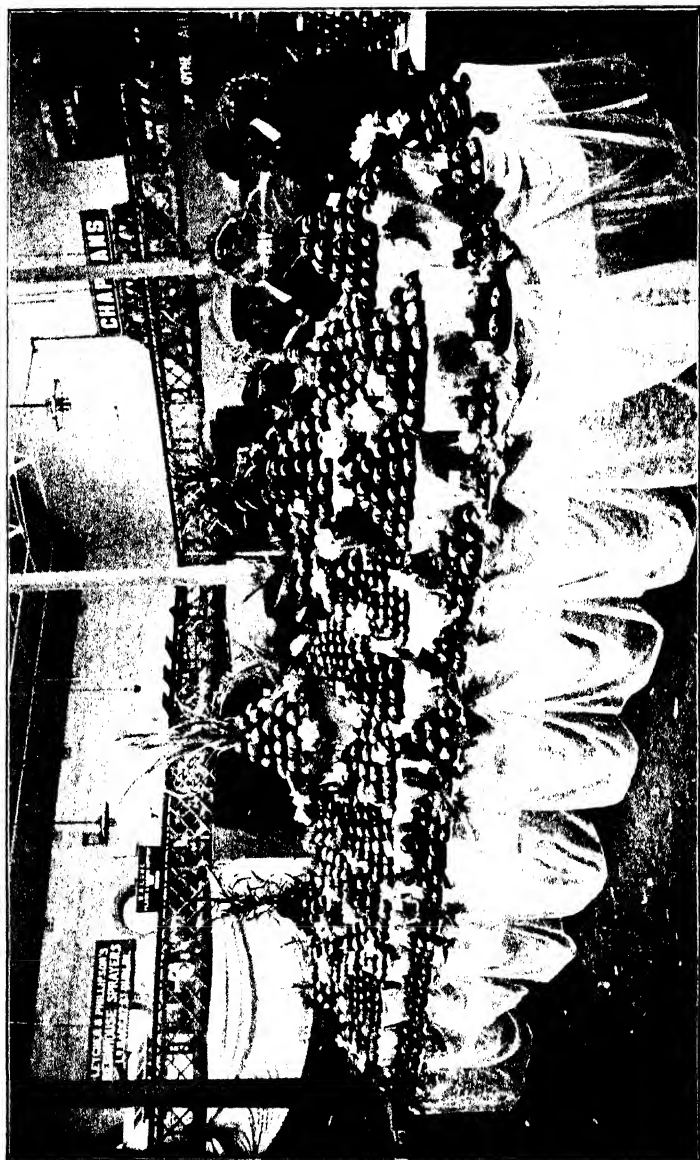
I have often been asked if there is a market for apples. Ask any grower of good apples has he a market. The market is all right. There is absolutely no difficulty in finding a market for the best quality of fruit. It is in the question of a market for average fruit that the difficulty comes in. Dozens of letters are written to the Department, and to me individually, complaining of the lack of a market for apples. Ask for a sample of the apples grown by these people and you will at once see why they cannot find a market. Some people seem to think that the Department ought to make a market for their rubbishy fruit. Now it is beyond the power of the Department to find a market for the rubbish sent up from many parts of Ireland. In any case, I hope for the sake of its own reputation that the Department will not encourage people to send up stuff of this description by trying to find a market for it. You can see some samples of such apples in the hall outside. They are simply picked off the ground and shoved into a barrel from which even the nails are not drawn. You can see any amount of such stuff, for which, of course, there

DUBLIN SHOW OF IRISH GROWN FRUIT. 1904.



3. Some single dish Exhibits of Cooking Apples.

DUBLIN SHOW OF IRISH GROWN FRUIT, 1904.



4. First Prize Nurserymen's Exhibit (Class 95).

is absolutely no profitable sale, dumped on the market. Sometimes the fruit is sent up in hampers with no paper lining and very loosely packed. Such stuff is not even fit for pulping. What is to be done? We must rise to the occasion. We must teach the farmers the proper way to grade, pack, and market their apples. Some people think that the best way to grow apples is to leave the trees to nature. Now that is altogether wrong. It is only by endless work that you can hope for the best results from your trees. For those who want good fruit all round it may be said that they must carefully tend their trees. Their aim should be the production of a crop of good quality, not the production of a large crop of poor or medium apples. Those men who say apples sell well are the men who grow a moderately-sized but good crop. Those who say there is no market leave their trees to nature and take no trouble in caring the crop, or putting it on the market in a proper condition.

Now we come to the case of the package. What is to become of the fruit when it is grown? I know that in the best districts in the North nearly all the best apples are being bought up and sent to South Africa. Now that market is bound to develop, and I do not see why we Irishmen should not make an effort to capture it. So far, as I have said, the Northern growers have been successful in sending out some of their best stuff. It must be remembered, however, that it is absolutely useless trying to sell mixed fruit. Fruit, especially apples, must be well graded before it will receive the best prices. We must remember that well-graded and well-packed fruit saves the salesman's time; and that is a consideration which must be taken into account. I will give you a demonstration of what is being done in this matter in England in connection with the Covent Garden market. I wrote to two well-known growers in Essex and Twickenham, and asked them to send me samples of their packages as they send them up to Covent Garden. Now these packages we have here contain first-class fruit exactly as they are sent to the Covent Garden market, and they invariably obtain the best prices simply because the name, or brand, on the box guarantees that they come from a well-known grower who can be relied on for only the best stuff. In this connection the question of brand arises. On the London market this is all the brand required—the grower's name and address branded on his boxes or packages. That man's name is enough to sell any quantity of his fruit after one package is opened. I have myself seen them sold in large quantities without being examined; his brand is his guarantee. I have heard the salesman, after he has

opened and shown one package, ask the buyers—"Shall I open any others?" and I have heard the reply on all sides—"No, no; don't waste your time," and they would be knocked down by the half-dozen and dozen as fast as ever the salesman could do it. Here I show you the packages exactly as they are sent to the market. You will see I have not even opened them, and don't know what varieties are in them. You see they use wood wool for packing.

Mr. MOORE then showed the packages of fruit from two growers in England, and answered several questions as to packing, grading, &c., also as to prices received in Covent Garden market.

Mr. TOLER GARVEY said experts who were going about to give advice to growers should pay attention to the question of sub-soil in order to prevent disappointment in the future. When one grew pears, apples, damsons and other trees that grew down to the sub-soil, if the sub-soil were bad the trees produced little fruit, became moss-grown, and were often cankered.

Mr. GEORGE HENRY (Sligo) said the difficulty in his part of the country was that there was no market. The railway freights were much too high, and the boxes in which he packed his stuff cost as much to come from Dublin as they would if they had come from New York.

Mr. SHERLOCK also complained of the want of local markets. He lived near Tullamore, and, though in the present Show he had taken second prizes for apples in all Ireland, the most he could get in his own district for the same apples was a penny a dozen. He found it cheaper to feed his pigs with them than to sell them on the market.

Mr. CAMPBELL (Cavan) urged that the Department should employ an expert, who would instruct the farmers how to pack and grade their apples, and also help them to a market.

Mr. BARKER (Manchester), who had acted as one of the judges, said that Show proved it was possible to grow fruit in Ireland, that to do so on a commercial scale was only a question of organisation and co-operation. One of the points that struck him was that the fruit should be arranged so that salesmen should be able to depend on having a large quantity of fruit of the same quality. He thought very highly of the packages recommended by the Department. Their merits were very great and their demerits very few. He always advocated non-returnable packages. First of all there was no expense in returning them to the grower.

Retailers would buy non-returnable packages more readily because they had not to pay a deposit on them, and in addition they entailed no expense in warehousing. A name must be made for Irish fruit; it must be got into the market, and they must at first pay a little for that privilege. When the Irish people became so used to grading that it was second nature to them he would advocate packing in layers, but till then the longer boxes were the best. The first object of Irish growers should be to keep out American and Continental fruits. Those fruits had captured the markets because they were better packed and graded, and were easier for salesmen to sell. Irish growers ought first to recover the home market for themselves and then send elsewhere. He did not think there would be great difficulty in getting fruit to London even from remote parts of Ireland; that is, if a large enough quantity was sent, for only in this way would they get facilities from the railway companies, and the manner in which they could do this was to introduce co-operation. In conclusion, he believed farmers ought to study the science of marketing just as keenly as they studied the science of production.

Mr. FLEWITT said the American, Canadian, and Californian systems for packing and styles of packages were by far the best.

Mr. WEST (Fermanagh) said they in the North did not find it hard at all to sell their apples when they lived in a good district. Anyone who had had their eyes about them in visiting that Show must see that in a few years there would not be an American apple coming into Ireland.

Mr. JAMES CLARKE said they had first of all to get rid of sentiment, and of the idea that because a variety of apple had been grown by their fathers it should be cultivated for ever. They should aim at finding out the varieties best suited for different districts and get rid of everything else. He thanked the Department for the work they had done for the Irish farmer, and especially for the results which had been achieved by the itinerant teachers.

Mr. EMPTDAGE said he represented an English market paper, and was deeply interested in fruit-growing. If he had not seen it with his own eyes, he would not have believed that Ireland could grow such fine fruit as was shown at that exhibition. He had not the smallest doubt if Irish growers would take due care to do all their instructors told them they would be able to produce such fruit as he did not think could be beaten by any other nation. Their apples had not only colour, but weight, and the only thing

needed was to put them on the markets in sufficient quantity and in a uniform level of quality. He had been looking round the boxes, and he thought the package that held 40lb. was the one for Ireland.

Mr. COLE (Dublin), after referring to misleading notes in the Dublin Press regarding the exhibition, said in Ireland they had as good fruit grown and as good markets to dispose of that fruit in as could be desired. The idea that Irish fruit growing could not be successful was absurd. When Irish fruit was good it always received preference from buyers, and got better prices from buyers than foreign fruit did. They had a great deal to do yet in supplying the wants of the home market without going outside it. He urged that Irish farmers should undertake the growing of pears, plums, cherries, black currants, melons, tomatoes, and rhubarb, for which there is a great demand. The growers could do a great deal for their own interests by making salesmen in different parts of the country pledge themselves to give a preference to Irish goods. That was a natural step, and if salesmen did take the pledge it would prove a very valuable preferential treatment to the Irish grower, which he was fully entitled to in his own markets. There had been a good deal of criticism, mostly hostile, to the packages, but those who suggested them had found that the growers had abused them in a most essential point—namely, in regard to grading. He might honestly say that a large number of packages were not graded as they were marked. If the growers were going to stand in their own light, the Department could do nothing for them. The salesmen could not be expected to go out of their way to sell irregularly packed fruit, and they were determined they would not do it. There should be an effort made to find out what fruits were more in demand, and from his experience he would recommend that the apples grown should be Bramley's Seedlings and Lane's Prince Albert, while the pears selected should be William, Bon Chretien, Pit-maston Duchess, Doyenne du Comice, and Beurre Diel. No better dessert apple could be obtained than the Beauty of Bath.

Mr. SAUNDERS said they should guard against the mistakes into which novices too often fell of planting too many varieties, of selecting worthless varieties, and packing and grading badly.

Colonel EVERARD said from the encouraging remarks they had heard, mostly from the other side of the Channel, there was little doubt that fruit-growing in that country would receive a great impetus. In the agenda paper it was asked that suggestions

should be made as to how the Department could foster that industry. Where examples of magnificent fruit were found in that exhibition, the Department should take notice of the district from which they came. They should cause an inquiry to be made into the physical character of the land, and publish a pamphlet giving the characteristics of the soil upon which the best fruit could be grown.

Father O'KIERAN (Carrickmacross) said there was not enough home-grown fruit to supply the Irish market, and the question was how to get fruit trees planted and how to bring the benefits of the fruit industry home to the people. The only way to do that was by co-operation. In his own parish they had adopted that system, and though when they began there were not ten good trees in the district, their first order amounted to 4,600 apple trees and 1,700 plum trees, and in the space of ten months they had planted 10,000 trees. They had consulted with the experts of the County Committee, and he thought that any authority would say that those trees, planted by small farmers who had but little experience, would be a credit to any nurseryman in Ireland. It was also imperative that they should co-operate in marketing as well as in producing, for it was only in that way that the industry would become a profitable one.

VICE-PRESIDENT—Perhaps it may be well if I say a few words, as from the Department, upon the points that have been raised and upon which it is suggested the Department should take action. I may say that perhaps the chief value of this Conference will be that it will give the Department, and the Agricultural Board which controls the Department in this matter, a very much better idea than they had before as to the amount of money they might profitably spend upon this branch of their miscellaneous work. I would just like to mention very rapidly a few of the points which have been raised by some of the speakers to-day. Perhaps the most interesting speech of all is the one we have just listened to from Father O'Kieran, and I must say that it is a most hopeful speech. The work which Father O'Kieran has just spoken of illustrates what can be done by private enterprise. How much more can be done by the various County Committees and by the Department? At the same time Father O'Kieran has utilised the County Committee and the experts sent down by the Department. He has set an example to other parishes throughout Ireland in getting the experts' services which are now available, in Horticulture and other matters, through the Committees of their own counties.



With regard to the main question raised, as to whether Ireland can grow fruit on a commercial scale and make it a commercial success, I do not think that after this Show and Conference that question can ever be raised again.

It would be a mere waste of your time if I were to go over the many points from which that question has been approached. I may say, however, that no difficulty has been raised that cannot, I think, be dealt with. We have been warned against neglecting some important considerations, but we have in the country now a fair number of experts who can keep us right upon these points. This Conference has certainly given the Department some very useful guidance as to the main points to which they should direct the attention of their experts and upon which the country will evidently need a good deal of assistance.

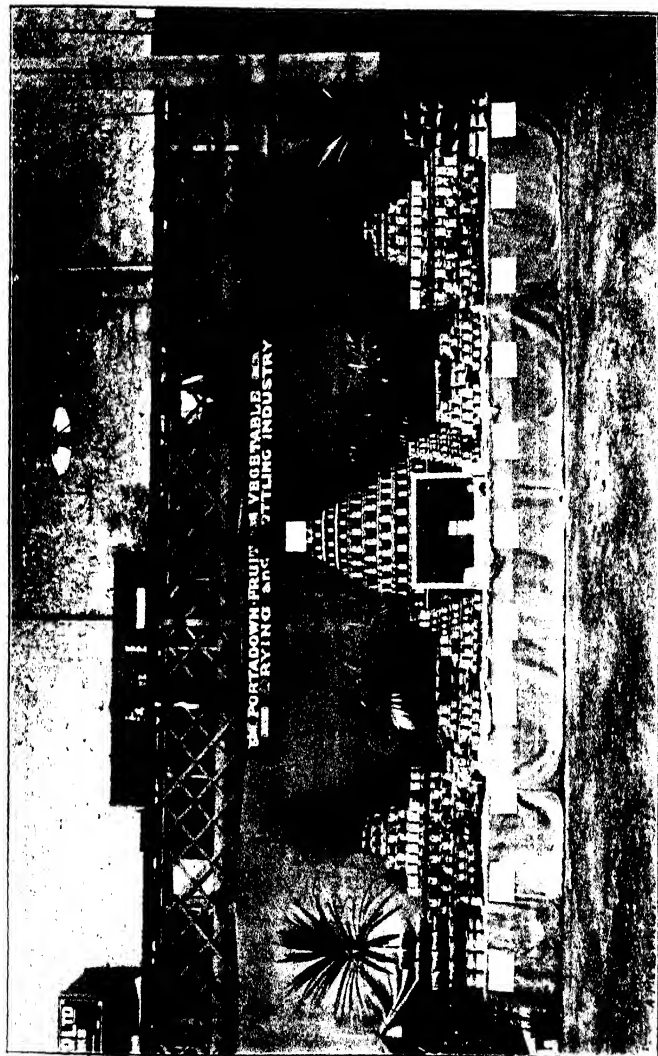
The question of the depredations in orchards is one that I was hoping the last speaker would have dealt with. Personally, my own belief is that it is no use speaking to a schoolboy upon moral grounds. Possibly, after this Conference and after the fruit-planting movement has been taken up generally, we can spread a feeling that it is unpatriotic to steal fruit.

On the question of grading and packing, I think we have very wisely not arrived at any final decision, but I am quite sure that Mr. Moore, Alderman Cole, Mr Orr, and those others who have given us the benefit of their advice and experience on these matters will continue to give us their help. It is absolutely essential, we see, that the Department should bring growers and salesmen together upon this point and come to some final decision upon it. It is quite clear, I think, that there must be some uniformity both in grading and in the packages.

A suggestion has been made that prizes might have been given for each county in this exhibition. Well, that, of course, can be considered on a future occasion. It should, however, be recollected that this exhibition was held with a special object. We did not want to do anything more than to take the growers by surprise, and got them to show their fruit and show what they were able to grow, and if the giving of prizes for separate counties had induced farmers to exhibit on a very much larger scale, I am afraid it would have been embarrassing to those who had to manage the exhibition. We will, of course, consider the question before we hold another show of the kind and see what is best to be done.

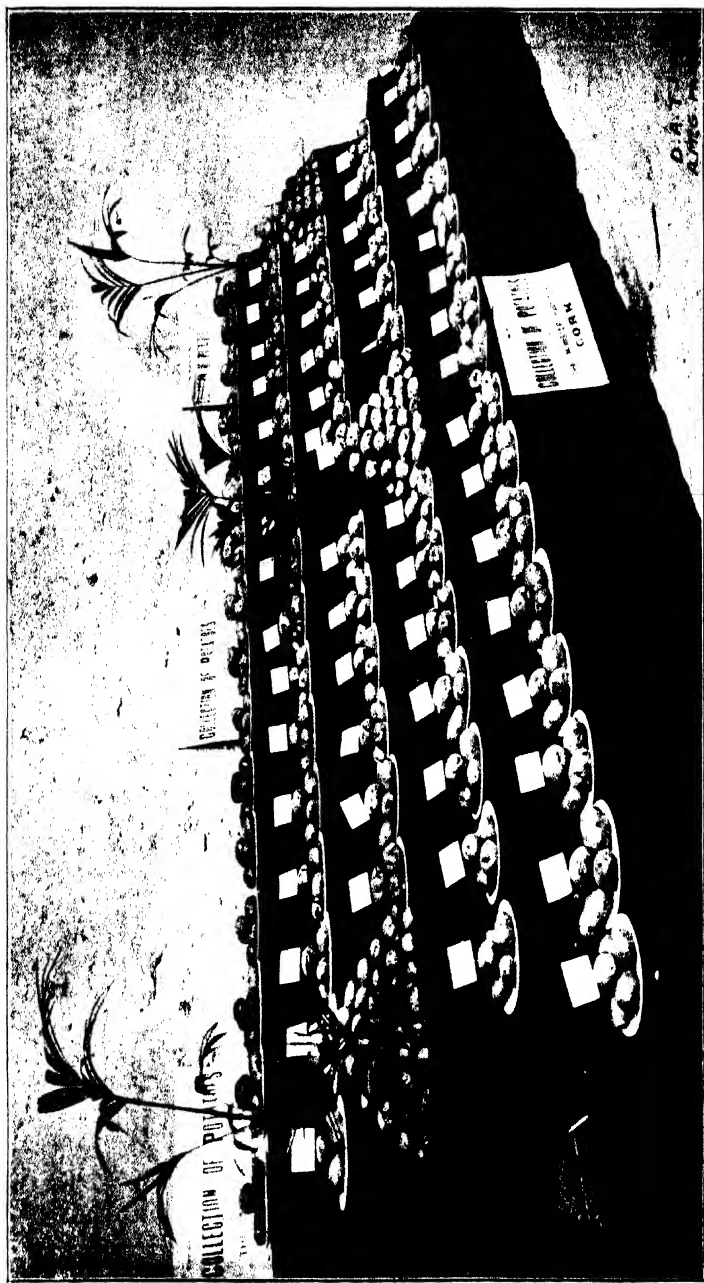
On the question of markets we have had several opinions from men who are well qualified to speak, and I really think that we

DUBLIN SHOW OF IRISH GROWN FRUIT. 1904.



5. Exhibit of Portadown Fruit and Vegetable Drying and Bottling Industry established by Department.

DUBLIN SHOW OF IRISH GROWN FRUIT, 1904.



6. Collection of varieties of Potatoes grown at the Munster Institute, Cork.

Irishmen must recognise at once that we have got to compete with the sharpest intellects of the world. Marketing has come to be a sort of competition between the nations of the world, each struggling to outdo everyone else. We have got to make our fight, and at least show that we are able to produce as good fruit as any other country in the world, and put it on the market at as cheap a rate and in as good a condition as any other country.

This Show and Conference have, I think, done a great deal to put before us the main lines on which our work must be done, and I, myself, look to the future with the utmost hope, because I do not think I have ever, since I have been connected with the Department, seen a meeting of Irishmen who have tackled a complex subject in a more business-like manner.

I am afraid I am already showing that I am not prepared to practise what I preach, and therefore will conclude by thanking you all most sincerely for making this Show a success, for coming here to give us the benefit of your advice, and I thank you still more for what I take to be your determination to build up this industry, which ought to have been got into a far more advanced stage long ago, but which it is of the utmost importance to develop rapidly, because otherwise we shall not inaugurate our new system of land tenure under favourable aspects. This is the important question before the nation at the moment, because what we are doing to-day is a very important step towards the solution of the problem of a prosperous peasant proprietary.

### REPORT ON THE SHOW.

The number of entries received was 2,664, a number which, considering that the Show was organised in the comparatively brief period of six weeks, must be regarded as very satisfactory.

In general the quality of the fruit shown was excellent, and although a few dishes of inferior fruit were staged they only served to emphasize the extremely high merit of the majority of the exhibits.

With regard to the number of exhibits from each province, Leinster was easily first, and at the same time the quality of the fruit was extremely good. Ulster and Munster, while represented by fewer entries, also sent fruit of good quality. The entries from Connaught were few in number, and the fruit scarcely reached the high standard of that produced in the other provinces. There was, however, on the whole a distinct improvement both as regards numbers and quality upon the display made at the Show organised by the Department and held at Cork in October. 1903.

In the Sections for single dishes of apples, prizes were offered in forty-one classes, and the entries totalled 1,533. It is satisfactory to note that in the classes for such sterling varieties as Worcester Pearmain, Blenheim Pippin, Cox's Pippin, Warner's King, Peasgood's Nonsuch, Bismarck, Lane's Prince Albert, and Bramley's Seedling the entries were large, and the quality of the exhibits left little to be desired.

In the Section for Pears, prizes were offered in ten classes, and 274 entries were received. Some excellent dishes of this fruit were staged, but exhibitors did not display sufficient attention in having their varieties correctly named.

In the Sections set apart for collections of six and twelve dishes of apples, classified according to provinces, 144 entries were received. These exhibits provided one of the features of the Show, and the fruit exhibited was remarkably good in both colour and size. The largest number of entries was received from Leinster, but the fruit shown from Munster and Ulster was in no way inferior to that exhibited by Leinster growers.

A section was provided for Jams, Preserved Fruits, and Packages. In this Section, prizes were offered in eighteen classes, and the entries numbered 470. The exhibits occupied almost the whole of the gallery surrounding the Main Hall. The chief object of the section was to direct attention to the importance of the proper grading and packing of first quality fruit when despatching to market. The best classes were those devoted to one dozen, and two dozen apples in flat boxes, and half-bushel and one-bushel case of apples, both of dessert and cooking varieties.

A special Section was provided for Jams, Preserved Fruits, and Cider. The number of entries was large, and the exhibits attracted general attention, especially the home-made Cider.

Perhaps the most conspicuous feature of the Show was the class for collections of Hardy Fruit grown in Ireland and shown by Irish Nurserymen. There were eight competitors. All the exhibits were good, especially those for which prizes were awarded. Each exhibit occupied a table twenty feet long by four feet wide.

Several non-competitive exhibits were included in the Show and added considerably to its attractions. These exhibits included collections of fruit, displays of flowers, shrubs, &c.

Special exhibits were sent by the Portadown Fruit and Vegetable Drying and Bottling Industry, and by the Boyne Valley Fruit Industry, illustrative of the work which is being carried on at these two centres.

A special exhibit of potatoes was shown by the Department. This consisted of seventy named varieties of potatoes, all of which had been grown at the Munster Institute, Cork.

## BARLEY GROWING IN IRELAND.

The increase that has taken place in the area of land devoted to grass in Ireland during the past twenty years has been accompanied by a substantial shrinkage in the acreage under barley, although this crop has held its own better than other cereals. The land which is naturally least suitable for permanent grass is that which, owing to its physical character, is most suitable for barley growing. Such land is usually the last to be abandoned in favour of grass. For this reason barley is still largely cultivated in certain districts, though the number of acres devoted to the crop in Ireland this year compares unfavourably with that of 1874—just thirty years ago.

Of all the conditions which affect the quality and yield of barley the climate holds the first place, but, being

**Soils most suitable for Barley Growing.** beyond our control, it need not be here discussed. Next in importance comes the soil.

The natural character of the soil determines in most of the barley-growing districts whether the crop may be profitable or not. The character of the grain produced on the various classes of land differs very widely; this difference being mainly a difference in the degree of maturation—the result of the combined influences of climate and soil.

Under similar climatic conditions, it appears that the physical condition rather than the chemical composition of the soil exercises the greater effect upon the maturation of the grain. Some soils naturally produce grain of great excellence even when they are farmed indifferently; others, however well farmed, cannot be made to produce grain of a sufficiently high degree of maturation to satisfy the maltster. The natural physical character of the soil may thus be the cause of excellence on the one hand or of inferiority on the other. Well-drained soils of a light and active nature generally produce the best barley, although in dry seasons the yield is often considerably reduced owing to the very peculiarity that favours good maturation. On such soils the straw is usually short, the proportion of grain to straw is high, and the period of vegetative growth is not prolonged. On stiff soils, on the other hand, vegetation is generally prolonged too much, the straw is long and weak, the proportion of straw to grain

is high, a low standard of maturation is attained, and the grain is less suited for malting purposes.

A good barley soil is open and dry, and workable almost at any time: presenting but little difficulty in the preparation of the seed-bed. Such a soil naturally carries good barley. Soils less suitable for barley may be improved by conditions that will hasten the period of vegetation, and so leave longer time and more favourable weather for the production of well-grown and well-matured grain. Such conditions are favoured by drainage, good and seasonable cultivation and lime. In soils where lime is deficient its application is recommended: marl being more suitable for light soils, lime for heavier.

Since the physical characters of soils affect the quality of the grain grown upon them, we must expect to find a difference in the quality of the grain as we pass from one geological formation to another, and experience has shown that a considerable difference is in many cases to be found—more marked in some than in others. In the following table an effort has been made to classify the Irish barley soils according to their geological origin; and some notes on their general physical nature, with the localities where they are to be found, are added.

Geological Formation.	Nature of Soil.	District in which Found.
Igneous, .. ..	Light sandy loams, deep and fertile.	Carne, co. Wexford, ..
Silurian (lower), ..	Soils on high ground, shallow and very shingly; on low ground, strong and sticky.	Eniscorthy, New Ross, Ferns. A very large proportion of the co. Wexford barley soils are of this formation.
Old Red Sandstone, ..	Good strong loams to light sandy gravelly soils.	Midleton, Youghal, and in other parts of co. Cork and Waterford, also in isolated areas in co. Tipperary.
Limestone, .. ..	Strong loams with retentive subsoil to light loams.	Midleton, Cork, Nenagh, Birr, Cloughjordan, Thurles, Tullamore, Maryboro, Kildare, Kinvara in Galway, and in other parts.
<b>DRIFT SOILS.</b>		
Sand and gravel of Cambrian origin.	Light fertile loams of great depth in some places.	Castlebridge and Curracloe in co. Wexford.
Limestone and Old Red Sandstone mixed.	Good fertile light loams to stiff loams with retentive subsoils.	Midleton and Youghal, ..
Limestone Gravel, ..	Good light gravelly loams to strong loams with retentive subsoils.	Nenagh, Birr, Cloughjordan, Thurles, Mountmellick,, Maryboro, Roscrea, Portarlinton, Tullamore, Kildare, and many other parts.
Igneous and Limestone,	Rich deep gravelly loams,	Carlingford, .. ..

From the above table it will be gathered that the soils on these formations differ considerably in physical character. The light and medium loams are used for barley-growing, most of the more retentive soils being under grass. Of the chemical deficiencies phosphoric acid is predominant, and a liberal application is recommended for all barley soils. Potash is not so generally deficient, although in some cases it has proved to be so, more especially on light limestone and sandy soils. Whenever this is found to be the case, a potash fertilizer gives a profitable increase in the crop, improves the quality of the grain, and helps to stiffen the straw. Most of the Irish barley soils contain a high percentage of organic matter, and consequently of total nitrogen, but there are exceptions. Some are very deficient in lime, notably those on the Lower Silurian formation, and some of the "limestone" soils show a very low percentage of this ingredient, quite contrary to the general belief. Only a limited area rests on rock of igneous origin, principally granite, and these soils are light in character but often deep and fertile: such soils are found in the Carne district of County Wexford, where they produce barley of good quality. The Old Red Sandstone or Brownstone soils are in some cases very fertile and too strong for barley, but generally speaking this is not the case, and many very suitable barley soils are found upon this formation. The Drift soils may be light and sandy, dry gravel, or retentive clay and marl. The light dry soils, especially the limestone gravels, are amongst the best soils for barley-growing in Ireland: heavy crops of excellent quality being produced upon them. Many such soils are found in Queen's County, King's County, County Tipperary, and elsewhere.

In preparation for the barley crop all soils, to whichever formation they belong, should be thoroughly tilled, and the seed-bed made fine before sowing is commenced. Insufficient cultivation always results in serious loss both in yield and quality. A rough seed-bed is productive of an uneven growth; it diminishes the feeding area of the plant, and, in harsh dry weather, causes rapid drying of the soil and injury to the roots of the crop. Weeds also cause great inconvenience during the harvest season, and diminish the yield; autumn cultivation should be resorted to as being the most successful method of getting rid of them, whenever



favourable weather in September and October renders such profitable work possible. More attention to this practice is most desirable.

The best time to sow barley is a question which has been much debated of recent years. At present the

**The Time to Sow.** tendency is towards sowing much earlier than formerly. This is, however, a matter which is largely governed by circumstances, and no general rule, applicable to all soils and the varying conditions under which barley is grown, can be laid down. It may safely be said that early sowing should never be attempted unless the soil is sufficiently dry to ensure the satisfactory preparation of the seed-bed, it being well known that the working of land when wet has a most injurious effect upon the crop.

The old system of ploughing in the seed has, in the great majority of cases, been superseded by the

**Sowing.** much quicker and better method of sowing with the corn drill. Some farmers, however, still prefer the old method, and under certain conditions it may give even better results than the new. The drilling machine, it is needless to say, works best on well-tilled land, and consequently on nearly all lands fit to be sown with barley. It has the great advantage over any other method of depositing the seed at a uniform depth in the soil; it distributes the seed with great regularity, and deposits it in rows, thus enabling the farmer to allow whatever space he considers best between them. The advantage of sowing in rows is to admit plenty of sunshine and to facilitate the circulation of air through the crop. It is well known that plants grown in shady places produce long, weak stems. So it is with overcrowded corn crops: the plants shade one another, and the leaves shut out the sunlight. Sunlight strengthens the straw; on lands, therefore, which habitually produce weak straw it is desirable to admit more sunlight, and this can be done by increasing the spaces between the rows. Barley should not, however, be sown too thin or it will tiller too much and ripen unevenly; experience alone will teach the farmer the most suitable method to follow on his particular soil. A width of from five to seven inches is generally allowed between the rows according to the character of the soil; to increase the space beyond this limit appreciably is probably unwise, as it causes uneven ripening and irregular grain.

In Ireland barley is most successfully grown after green crops, owing, probably, to the previous tillage and cleaning and to the manurial condition of the soil being better for barley than in other positions in the rotation. **The Place of Barley in Crop Rotation.** Lea barley is not a success. A second barley crop after a green crop is only recommended when the land is clean and well manured, otherwise the crop will become over-run with weeds, and great expense will have to be incurred in cleaning the land after the second corn crop has been removed.

It has already been noted, when dealing with soils, that phosphoric acid and potash are most frequently deficient in Irish barley soils. Unless it is known absolutely that they are not required, liberal dressings of phosphates and potash should be applied along with farmyard manure to the root crop preceding the barley. Following a well-manured root crop, barley needs no manure, but, following an unmanured or inadequately-manured crop of any kind, it requires a complete manurial mixture on all but the richest soils. Nitrogenous manures, however, must be used in moderation, or they will cause an over-luxuriant vegetation. For barley after unmanured barley or oats, a good combination is one hundred-weight nitrate of soda, three hundredweights kainit, and three hundredweights superphosphate per statute acre. This mixture should be applied before the last harrowing in covering in the seed, and if the potash is applied some time previously so much the better. Sulphate of ammonia may be used instead of nitrate of soda, but the latter is probably the better of the two, as sulphate of ammonia produces its greatest effect late in the season, and often causes barley to throw out a late second growth. Superphosphate and nitrate of soda may be mixed together if applied immediately after mixing, but they must not be allowed to lie in a heap or the mixture rapidly deteriorates. Sulphate of ammonia must on no account be mixed with lime or any fertilizer containing free lime, because its fertilizing properties will be lost. On lands deficient in lime, superphosphate should not be used unless first mixed with a small quantity of bone dust to absorb the free acid it contains. On land deficient in lime the application of lime, marl or chalk is very desirable. It should be remembered that nitrogenous fertilizers tend to encourage the growth of straw, while phosphatic and potash fertilizers encourage grain formation.

Owing to the great difference in the natural character of the soils upon which barley is grown, the farmer **Varieties of Barley.** is often at a loss to know which of the many so-called varieties of barley to sow. The selection of the most suitable variety for any particular soil is a matter of considerable difficulty, and one which can only be decided by experience. The crop which pays best is the one which produces a heavy yield of grain of sufficient merit for malting purposes; a variety producing a grain of only slightly improved quality at the expense of yield is not the barley to recommend, particularly in Ireland, where there is but a small margin between the highest and lowest market price for malting barley. In selecting seed there are several things to be considered apart from the selection of a particular variety. The sample should on no account be a mixture of different types of barley; it should be sound, *i.e.*, not heated, mouldy, or sprouted; it should be free from the seeds of weeds, and taken from a crop free from smut and other injurious fungoid diseases. There are a great many varieties of the usually cultivated barleys, but all may be reduced to two main types, *viz.*, the broad-eared type, of which Goldthorpe and Standwell are examples, and the narrow-eared or Chevalier type.

Goldthorpe is typical of the wide-eared barleys grown at the present time. Its distinguishing features are the wide shape of the ear; a strong straw which becomes very brittle at the neck when the grain ripens (a peculiarity associated with the risk of serious loss from the ears breaking off during harvesting operations); a large grain of characteristic bright colour less liable than Chevalier barley to stain in unfavourable harvesting weather; and usually a superior malting quality. The wide-eared barleys generally give the best results on rich or strong soils owing to the superior strength of the straw. As a rule they are only grown on the soils upon which Chevalier barleys will not stand up.

On light lands the Chevalier type is the most suitable. Its production is accompanied with less risk of loss from the ears breaking off during the ripening and harvesting, but the straw is weaker than the wide-eared type and more liable to lodge, and the grain soon loses its colour in unfavourable harvesting weather, consequently it is not well suited for strong or very rich soil.

There are many improved or selected Chevalier barleys on the market, most of them being very much alike in habit of growth and in the character of the grain produced. In Ireland the Chevalier

barleys imported from Scotland give excellent results, not because they are a distinct variety, but owing probably to the influence of the Irish soil and climate upon a barley of good constitution coming from a more northern climate. A large proportion of the barleys imported from Scotland at the present time are Hallett's Pedigree and Webb's Kinver, called Scotch Chevalier, because grown in Scotland.

In England, Scotland, and Ireland barleys known as Common Chevalier are still grown, and in each of these countries they are still very similar in their natural peculiarities, generally producing a heavy yield of long coarse grain, and a strong wiry straw. In many respects Archer's Chevalier is similar to the common barleys, and is perhaps a selection from them. This barley has, of recent years, been introduced into Ireland, and has become very popular amongst the farmers of several districts on account of its prolific nature and the superior strength of the straw it produces as compared with other Chevaliers. It is a late-ripening barley, and must be sown early to give its best results. A good average malting sample may then be expected, under normal conditions, although as a rule it is not quite equal to other Chevaliers in this respect. On the limestone and brownstone barley soils it has proved to be an excellent cropper, but it has not given such satisfactory results on some of the Silurian soils of County Wexford. The quality of the grain on these soils has in some cases been disappointing and occasionally quite unfit for malting purposes. Archer's is, however, a barley which is worth a trial on most of the Irish barley soils on account of its heavy yield and the strength of its straw.

The new barleys introduced by Messrs. Garton have been tested extensively during the investigations into this question, but so far, though the quality of the grain has been generally good, there has been in most cases a falling-off in yield which has more than balanced the gain from improved quality when compared with Chevalier Barley. These barleys appear to give better results after they have been grown for one or two years in Ireland; in their first year they invariably suffer very much from fungoid attacks, which cause the straw to become very brittle and unable to withstand heavy rain and wind. Of the Garton varieties the Brewers' Favourite has given the most satisfactory results, and it is

a barley which may suit some soils, as it grows a stout straw and generally a sample of good quality. "The Maltster" has not been tested.

Beardless barley must be mentioned amongst the varieties of barley grown in Ireland. These barleys may be either of the narrow or wide-eared type. They have awns which are supposed to fall off, but this character does not appear to be persistent, and may recur more or less, and with no certainty. Whether the awns drop off or not probably depends on the weather. Barleys showing this peculiarity are grown in some districts in Ireland and generally produce a grain rather coarse in quality, and a strong straw which suits them for the stronger soils.

Barley for malting purposes should be allowed to stand till perfectly ripe before it is cut. During the latter part of the ripening process important changes take place in the kernel, and these changes, if checked by cutting too soon or by premature ripening from unfavourable climatic conditions, injure the quality of the grain for malting purposes very considerably. In the case of Chevalier barleys the best time to cut is when the ear knuckles down and the grain becomes quite hard. It is not so easy to decide as to the most economical time to cut barleys of the wide-eared type, as the danger of losing a large number of ears from allowing them to ripen perfectly has to be taken into account. These barleys have a stouter straw than the Chevaliers, and may consequently retain more sap to assist further maturation after cutting: this point has not yet been clearly demonstrated. They should be watched carefully and cut before they are much broken down, or the waste will be great. Barley cut down too soon is known by the unnatural white colour of the skin, and the dark glossy appearance of the kernel. Well-matured barleys may vary considerably in colour, but are mellow in appearance, well filled, and present a white mealy interior when cut across with a sharp penknife.

The usual method of saving barley in Ireland is probably the best one to adopt in such an uncertain climate. In favourable weather it usually consists of cutting the crop when ripe, stooking immediately, allowing it to stand three or four days in stook, and then either ricking out of stook or putting into small hand-stacks

in the field, according to the condition of the crop and the probability of fine or wet weather. Field-stacking is the more rapid method of getting the crop comparatively safe, and is always resorted to, and wisely, in unsettled weather and when the farmer is short-handed. When the crop contains a lot of grass and weeds, field stacking is especially useful, particularly if the crop has had rain upon it after being stooked and the ground is wet. It is a mistake to make the stacks too large, the object being to dry the butt end of the sheaves containing the green material.

The existing conditions under which barley is marketed and malted in Ireland necessitate an early delivery at the maltster's stores, consequently it would be unreasonable to advise farmers to allow their barleys to remain for some weeks in the rick before threshing, although such treatment would improve them provided they were ricked in good condition. This, however, is often a difficult matter in Ireland, and in many seasons the system now followed is the safer to adopt.

Careless threshing has in the past often been the cause of considerable loss to both farmer and maltster ;

**Threshing.** but latterly farmers have given this matter closer attention, and the result is visible throughout the barley-growing districts. Broken grains, skinned grains, and bad screening are defects to guard against, which the man attending the machine, if he understands his business, can generally rectify with but little trouble.

## FIELD EXPERIMENTS, 1904.

## BARLEY.

These experiments are a repetition of those carried out in 1901, 1902, and 1903. The object is to ascertain:—

- (1) The most suitable variety to grow in the barley districts in Ireland;
- (2) The most economical artificial manures for barley.

The results are considered from two standpoints:—

- (a) Yield and market value of the crops;
- (b) Their merit for malting and brewing purposes

The 1904 experiments were extended to Queen's County, and consisted of:—

*Series No. 1.—Large Scale Experiments.*—These were carried out at two centres in each of the following counties:—Cork, Tipperary, Wexford, Louth, and Queen's County. The plot at one centre in each county was sub-divided into four sub-plots of two statute acres, while the other plot in the same county was sub-divided into three sub-plots of two acres and one ten-acre plot.

The varieties tested were Archer's Chevallier and Goldthorpe in all the counties; in Tipperary, Scotch Chevallier and Old Irish were added; in Louth, Standwell and Old Irish; in Wexford and Queen's County, Standwell and Scotch Chevallier.

In County Cork three varieties only were tested:—Archer's Chevallier, Goldthorpe, and Standwell—the last-named from seed supplied by Messrs. J. J. Murphy & Co., Ladyswell Brewery, Cork.

*Series No. 2.—Small Scale Experiments.*—These were reduced in 1904 to two manurial experiments in County Cork, the increase in number of the Large Scale Experiments being deemed sufficient for the comparison of the varieties of barley at present being tested. Each plot was  $2\frac{1}{2}$  acres in extent, and was sub-divided into five plots of  $\frac{1}{2}$  acre each, which were used to test the effects of the application of Ammonium Sulphate, Superphosphate, and Kainit alone and in combination.

*Series No. 2.—Additional Experiments.*—Plots of three acres in extent in Counties Cork, Louth, and Wexford respectively were sown with Six-Rowed Winter Barley in November, 1903, to test this winter-sown barley against spring-sown varieties.

All the samples were valued as delivered in Dublin.

The season of 1904, although better than the preceding one, was characterised in the earlier months by continual rainfall, and during the latter period of the harvest by similar conditions.

Throughout the whole country the yield of the barley crop has been much below the average, which may be largely attributed to

a wet winter and spring, with the attendant evil of a cold damp and imperfectly-prepared seed-bed.

*Series No 1.—Variety Test.*—The object of this experiment was to compare the yield and quality of the varieties Archer's Chevallier, Goldthorpe, Standwell, Scotch Chevallier, and Old Irish, which were grown at ten centres, as detailed below.

The following Table shows in each centre the name of the experimenter the character of the soil and sub-soil, and its previous treatment :—

Name of Centre.	Experimenter.	Character of Soil, and Subsoil.	Previous Treatment of Land.
1. Midleton, Co. Cork.	P. M'Carthy, Ballinacurra.	Good limestone loam. Subsoil—Yellow friable clay. Geol. form.—Carboniferous limestone.	1901, Grass. 1902, Oats. 1903, Roots, with farmyard manure and artificials.
2. Whitegate, Co. Cork.	R. Hawkins, Whitegate.	Good brownstone loam. Subsoil—Brownstone gravel and shale. Geol. form.—Old red sandstone.	1901, Seeds. 1902, Oats. 1903, Roots, with farmyard manure and artificials.
3. Nenagh, Tipperary.	J. Wolfe, Rockford.	Light loam of medium depth. Subsoil — Gravelly clay. Geol. form.—Carboniferous limestone.	1901, Grass. 1902, Grass. 1903, Oats.
4. Birr, Co. Tipperary.	J. Willington, St. Kieran's.	Good strong loam. Subsoil—Shaly. Geol. form.—Carboniferous shale.	1902, Roots, with farmyard manure. 1903, Oats.
5. New Ross, Wexford.	W. Roche, Larkin's Mill.	Drift loam of medium depth. Subsoil—Shaly. Geol. form.—Lower Silurian.	1901, Oats. 1902, Oats. 1903, Roots, with farmyard manure and artificials.
6. Wexford, Wexford.	W. B. Nunn, Castle Bridge.	Good fertile loam. Subsoil—Sand. Geol. form.—Cambrian.	1901, Swedes. 1902, Oats. 1903, Roots, with farmyard manure and artificials.
7. Carlingford, Co. Louth.	J. Kearney, Wilville.	Good drift loam. Subsoil—Gravelly. Geol. form.—Carboniferous limestone.	1902, Oats. 1903, Potatoes, with farmyard manure.
8. Dunleer Co Louth.	S. Segrave, Dunany.	Strong loam. Subsoil—Yellow clay. Geol. form.—Lower Silurian.	1902, Oats. 1903, Roots, with farmyard manure.
9. Portarlinton, Queen's Co.	C. Kelly, Oahra House.	Loam of good depth. Subsoil — Limestone gravel. Geol. form.—Carboniferous limestone.	1901, Roots. 1902, Barley. 1903, Roots, with farmyard manure and artificials.
10. Monasterevan, Queen's Co.	J. Allardyce, New Inn.	Sandy loam of good depth. Subsoil — Limestone gravel. Geol. form.—Carboniferous limestone.	1902, Oats. 1903, Roots, with farmyard manure and artificials.

#### Notes.

At Centre No. 3 the barley received a complete artificial dressing, consisting of 1 cwt. Ammonium Sulphate, 3 cwt. Superphosphate, and 2 cwt. Kainit.

At Centre No. 5 a similar complete artificial dressing was applied, and 1 cwt. of Sodium Nitrate was in addition applied to the Archer plot in May.

At Centre No. 10 1 cwt. of Sodium Nitrate per acre was applied to the Archer plot, which had suffered badly from a wireworm attack.



The following Table shows in the case of each centre the yield and the average yield and money value for each variety:—

TABLE OF YIELDS AND MONEY VALUES PER

FARMER.	ARCHER.		GOLDTHORPE.	
	Yield per Acre.	Value per Acre.	Yield per Acre.	Value per Acre.
P. McCarthy, Ballinacurra, Co. Cork.	Brls. st. s. d. 10 4 at 14 9	£ s. d. 7 11 2	Brls. st. s. d. 11 14 at 15 6	£ s. d. 9 4 0
Screenings, ...	0 7	0 3 6	0 7	0 3 6
Total, ...	10 11	7 14 8	12 5	9 7 6
R. Hawkins, Whitegate, Co. Cork.	10 11 at 15 0	8 0 6	10 3½ at 15 6	7 18 5
Screenings, ...	0 12	0 6 6	0 10½	0 5 3
Total, ...	11 7	8 6 6	10 14	8 3 8
J. Wolfe, Nenagh, Co. Tipperary.	13 3 at 15 6	10 4 5	11 8 at 15 9	9 1 1
Screenings, ...	0 10	0 5 0	0 11	0 5 6
Total, ...	13 13	10 9 5	12 3	9 6 7
J. Willington, Birr, Co. Tipperary.	11 2½ at 15 0	8 7 5	11 13½ at 15 3	9 0 7
Screenings, ...	1 3½	0 9 9	0 7½	0 3 9
Total, ...	12 6	8 17 2	12 5	9 4 4
W. Roche, New Ross, Co. Wexford.	8 2 at 12 9	5 3 7	7 0 at 13 6	4 14 6
Screenings, ...	1 9	0 12 6	1 7	0 11 6
Total, ...	9 11	5 16 1	8 7	5 6 0
W. B. Nunn, Onstlebridge, Co. Wexford.	9 1½ at 16 0	7 5 7	6 4 at 15 6	4 16 10
Screenings, ...	0 4	0 2 0	0 4	0 2 0
Total, ...	9 5½	7 7 7	6 8	4 18 10
J. Kearney, Carlingford, Co. Louth.	8 0 at 15 3	6 2 0	9 7 at 15 6	7 6 4
Screenings, ...	0 9	0 4 6	0 6	0 3 0
Total, ...	8 9	6 6 6	9 13	7 9 4
S. Segrave, Dunleer, Co. Louth.	12 1 at 14 6	8 14 10	11 7 at 15 6	8 17 4
Screenings, ...	1 12	0 14 0	1 4	0 10 0
Total, ...	13 13	9 8 10	12 11	9 7 4
C. Kelly, Portarlinton, Queen's Co.	12 1 at 15 6	9 6 11	11 3 at 15 9	8 16 2
Screenings, ...	0 10½	0 5 3	0 6½	0 3 3
Total, ...	12 11½	9 12 2	11 9½	8 19 5
J. Allardyce, Monasterevan, Queen's Co.	10 6½ at 14 9	7 13 5	10 5 at 15 6	7 19 10
Screenings, ...	0 15	0 7 6	0 15	0 7 6
Total, ...	11 5½	8 0 11	11 4	8 7 4
Average, ...	11 6	8 4 6	10 13	8 1 4
Average, 1903, ...	10 7	7 5 9	8 10	6 9 5
Average, 1902, ...	12 12½	9 7 11	12 1	9 0 9
Average, 1901, ...	11 14	8 12 8	9 10½	7 1 11

per statute acre, price per barrel, the total value per statute acre,

ACRE OF BARLEY EXPERIMENTAL PLOTS, 1904.

STANDWELL.			SCOTCH CHEVALLIER.			OLD IRISH.		
Yield per Acre.		Value per Acre.	Yield per Acre.		Value per Acre.	Yield per Acre.		Value per Acre.
Brls. st.	s. d.	£ s. d.	Brls. st.	s. d.	£ s. d.	Brls. st.	s. d.	£ s. d.
9 9 at 15 9		7 10 7	—		—	—		—
0 4		0 2 0	—		—	—		—
6 13		7 12 7	—		—	—		—
10 12 at 15 6		8 6 7	—		—	—		—
0 6½		0 3 3	—		—	—		—
11 2½		8 9 10	—		—	—		—
—		—	12 1 at 15 6		9 6 11	10 13 at 14 9		7 19 5
—		—	0 6		0 3 0	0 9		0 4 6
—		—	12 7		9 9 11	11 6		8 3 11
—		—	10 11 at 15 0		8 0 4	12 3 at 14 9		8 19 10
—		—	0 15		0 7 6	0 9		0 4 6
—		—	11 10		8 7 10	12 12		9 4 4
7 5 at 13 6		4 18 8	7 8 at 12 9		4 15 7	—		—
0 7		0 3 6	1 2		0 9 0	—		—
7 12		5 2 2	8 10		5 4 7	—		—
5 12 at 15 3		4 7 8	7 8 at 12 9		5 16 3	—		—
0 2		0 1 0	0 3		0 1 6	—		—
5 14		4 8 8	7 11		5 17 9	—		—
8 12 at 15 3		6 13 6	—		—	8 15 at 14 6		6 9 7
0 4		0 2 0	—		—	0 11		0 5 6
9 0		6 15 5	—		—	9 10		6 15 1
11 13 at 15 6		9 3 1	—		—	12 12 at 14 3		9 1 8
0 10		0 5 0	—		—	0 15		0 7 6
12 7		9 8 1	—		—	13 11		9 9 2
10 10 at 16 0		8 10 0	11 2 at 15 9		8 15 2	—		—
0 4½		0 2 3	0 6		0 3 0	—		—
10 14½		8 12 3	11 8		8 18 2	—		—
9 13 at 15 9		7 14 6	10 0 at 15 6		7 15 0	—		—
0 8		0 4 0	0 11		0 5 6	—		—
10 5		7 18 6	10 11		8 0 6	—		—
9 10		7 6 0	—		—	—		—
7 12		6 1 3	—		—	—		—
10 6½		7 16 2	—		—	—		—
8 1		5 19 6	—		—	—		—

TABLE SHOWING AVERAGE YIELDS OF THE VARIETIES TESTED IN COUNTIES CORK, TIPPERARY, WEXFORD, LOUTH, AND QUEEN'S COUNTY, 1904.

COUNTY.	ARCHER	GOLD-THORPE.	STAND-WELL.	SCOTCH.	OLD IRISH.
	Brls. St.	Brls. St.	Brls. St.	Brls. St.	Brls. St.
Cork, ... ..	11 1	11 9	10 8	—	—
Tipperary, ... ..	13 0	12 4	—	11 7	12 1
Wexford, ... ..	9 8	7 7	6 13	8 2	—
Louth, ... ..	11 3	11 4	10 12	—	11 11
Queen's, ... ..	12 0	11 7	10 9	11 1	—

*Notes.*

The screenings have been valued throughout at 8s. per barrel.

*Archer's Chevallier* in point of yield has maintained its position, but in quality is still inferior in the majority of cases to *Goldthorpe* and *Standwell*. A noteworthy exception to this is to be found at Centre 6. Here the soil is a light sandy loam with a sandy sub-soil. The *Archer* was ready to cut at the same time as the other varieties, and although subjected to very unfavourable weather during harvesting, it produced the best sample of the variety in the whole five counties, clearly pointing to its suitability on light open soils.

In money value, however, owing to its heavy yielding powers, it continues to hold the lead, although this year it only exceeds the *Goldthorpe* by 3s. 2d. per statute acre.

—	Average Yield per Statute Acre.	Average Value per Statute Acre.
		£ s. d.
Archer, ... ..	11 barrels, 6 stones.	8 4 6
Goldthorpe, ... ..	10 „ 13 „	8 1 4

*Archer* has, as in former years, been noticeable for its late ripening, and at many centres was cut no less than ten days later than the other varieties.

*Goldthorpe* has produced a good crop both in yield and quality, confirming the high place it has taken in previous years.

*Standwell*.—The produce of this variety has been good in quality, taking the first place amongst the varieties, but in quality and money value per acre it is the lowest of any variety tested this year. The following Table shows the yield and value per

acre of Standwell, as compared with other varieties grown at the same centres :—

—	Average Yield per Statute Acre.	Average Value per Statute Acre.
		£ s. d.
Archer, ... ..	10 barrels, 1½ stones.	7 17 4
Goldthorpe, ... ..	9 „ 11½ „	7 15 4
Standwell, ... ..	9 „ 4½ „	7 5 11

*Scotch Chevallier*.—This variety has proved itself an earlier ripening and maturing barley than Archer's. While in quality it is better than the latter, in yield and money value it has proved itself inferior. At several centres it became laid or “lodged,” and as a rule it has not the same power of withstanding stormy weather as the Archer. The following Table shows the average yield and money value of this variety, as compared with other varieties along with which it was grown :—

—	Average Yield per Statute Acre.	Average Value per Statute Acre.
		£ s. d.
Archer, ... ..	10 barrels, 10½ stones.	8 8 1
Goldthorpe, ... ..	9 „ 11 „	7 14 3
Scotch, ... ..	9 „ 13 „	7 13 7

*Old Irish*.—A Chevallier type of barley; has been remarkable this year for its early ripening and good yields of grain. In quality it has not reached the standard of the other Chevalliers, and the grain as a rule was coarse in character.

The straw, although better than that of the broad-eared types of barley, was not such a good upstanding one as the Archer. The following Table shows the yields and money values as compared with other varieties grown at the same centre :—

—	Average Yield per Statute Acre.	Average Value per Statute Acre.
		£ s. d.
Archer, ... ..	11 barrels, 1½ stones.	8 15 5
Goldthorpe, ... ..	11 „ 0½ „	8 16 10
Old Irish, ... ..	11 „ 2½ „	8 8 1

Judging the barleys as a whole this year, they have been fairly free from fungoid diseases. At Centre 5 (New Ross) the varieties suffered from an attack of rust, but it was not observed to any extent at other centres.

Heads of smut were observable in the Standwell at all centres.

As the spores or seeds of smut are carried on the barley grain, care should be exercised in obtaining seed from a crop which has been free from this disease.

*Series 2.—Small Scale Manurial Experiments.*—These were carried out at two centres in County Cork. The following Table

The following Table shows the yield per statute acre, price per different artificial manures alone and in combination:—

FARM.	No Manure.				1 cwt. Ammonium Sulphate.			
	Yield per Statute Acre.	Value per Statute Acre.	Bushel Weight.	Screenings per cent.	Yield per Statute Acre.	Value per Statute Acre.	Bushel Weight.	Screenings per cent.
1. ...	Brls. st. 8 14 at 14s. 6d.	£ s. d. 6 8 8	Lbs. 51½	12½	Brls. st. 8 8 at 14s. 6d.	£ s. d. 6 3 3	Lbs. 52	11½
Screenings, ...	1 5	0 10 6	—	—	1 1	0 8 6	—	—
Total, ...	10 3	6 19 2	—	—	9 9	6 11 9	—	—
2. ..	6 12 at 14s. 9d.	4 19 7	53	10·0	7 11 at 14s. 9d.	5 13 5	51½	12½
Screenings, ...	0 12	0 6 0	—	—	1 1	0 8 6	—	—
Total, ...	7 8	5 5 7	—	—	8 12	6 1 11	—	—
Cost of Manures per Acre, ... ..					13s. 6d.			
1, ... ..					Loss, ... 21s. 11d. per Acre.			
2, ... ..					Profit, ... 2s. 10d. per Acre.			

Screening are valued

shows the character of the soil and subsoil, and the previous treatment of the land at each centre:—

SMALL SCALE MANURIAL EXPERIMENTS.—TABLE SHOWING CHARACTER AND PREVIOUS CULTIVATION OF SOIL.

Experimenter.	Centre.	Character of Soil.	Previous Crops.
1. D. Kelleher, Co. Cork.	Stumpphill, Middleton.	Good limestone loam. Subsoil — Yellow clay.	1902. Grass. 1903. Oats.
2. M. Murnane, Co. Cork.	Milltown, Middleton.	Good strong loam. Subsoil — Friable yellow clay.	1902. Potatoes with farm-yard manure. 1902. Barley.

barrel, and the profit or loss per acre resulting from the use of the

1 cwt. Ammonium Sulphate; 3 cwt. Superphosphate.				3 cwt. Superphosphate; 3 cwt. Kainit.				1 cwt. Ammonium Sulphate; 3 cwt. Superphosphate; 3 cwt. Kainit.			
Yield per Statute Acre.	Value per Statute Acre.	Bushel Weight.	Screenings per cent.	Yield per Statute Acre.	Value per Statute Acre.	Bushel Weight.	Screenings per cent.	Yield per Statute Acre.	Value per Statute Acre.	Bushel Weight.	Screenings per cent.
Brls. st.	£ s. d.	Lbs.		Brls. st.	£ s. d.	Lbs.		Brls. st.	£ s. d.	Lbs.	
9 8	6 17 9	53	126	9 15	7 13 0	54	70	10 5	7 12 1	54	88
at 14s. 6d.				at 15s. 6d.				at 14s. 9d.			
1 6	0 11 0	—	—	0 12	0 6 0	—	—	1 0	0 8 0	—	—
10 14	7 8 9	—	—	10 11	7 19 0	—	—	11 5	8 0 1	—	—
8 5	6 4 8	53½	119	9 12	7 11 2	53½	60	11 2	8 12 5	54	91
at 15s.				at 15s. 6d.				at 15s. 6d.			
1 2	0 9 0	—	—	0 10	0 5 0	—	—	1 2	0 9 0	—	—
9 7	6 12 8	—	—	10 6	7 16 2	—	—	12 4	9 1 5	—	—
20s. 7d.				14s. 7d.				28s. 1d.			
Loss, 11s. per Acre.				Profit, 6s. 3d. per Acre.				Loss, 7s. 3d. per Acre.			
Profit, 7s. 6d. per Acre.				Profit, 9s. per Acre.				Profit, 47s. 9d. per Acre.			

throughout at 8s. per barrel.

*Notes on Small Scale Manurial Experiments.*

The soils at Centres 1 and 2, although very similar in character and origin, were widely different in their relative states of fertility. Hence at one centre the use of manures has resulted in a very profitable increase of grain, and at the other, where the soil was already capable of producing a good crop, a loss on all the plots except one has been the result.

Ammonium Sulphate has, as in former years, given unsatisfactory results at both centres. An excessive vegetation accompanied its use, and at Centre 1, owing to the corn being badly laid early in July, the yield and quality of the barley was greatly reduced. With the addition of Superphosphate an increase of grain was obtained, and the quality of the same was slightly improved, while with the further addition of Kainit—thus making a complete mixture—there was a still more marked improvement in the quality of the grain produced, although the yield was not greatly increased thereby.

The mixture of Superphosphate and Kainit alone had much greater effect on the quality of the barley produced than on the quantity. The yield at Centre 1 was actually less than when Ammonium Sulphate and Superphosphate were used in combination, but the improved quality of the grain enabled this plot to produce the only profit obtained at Centre 1. Throughout the year this and the corresponding plot at Centre 2 presented the most even appearance and stood the weather when all the other plots became more or less laid.

It will also be noticed that on these plots not only is the quality of the grain much improved, but the total quantity which reaches a malting standard is increased.

At both centres this year the Superphosphate and Kainit plot has given the smallest percentage of small corn or screenings. This is also noticed in the experiments of previous years.

It is clearly seen from the large returns obtained by the application of all the manures at Centre 2 that the land was in a poor state of fertility, and the results obtained here are not to be depended upon too implicitly for the generality of barley-growing soils. With a soil producing only  $6\frac{1}{4}$  barrels per acre any manure might confidently be expected to yield a profitable increase.

*Series No. 3.—Additional Experiments.*

*Winter Barley.*—This variety, which bears six rows of grain in the ear instead of the usual two rows, was sown at one centre in

each of the following counties:—Cork, Louth, and Wexford, the plot in each case being three acres in extent.

The following Table shows the character of the soil and sub-soil and the previous cultivation of the land:—

Experimenter.	Centre.	Character of Soil.	Previous Cultivation.	Date of Sowing.
1. P. McCarthy, Ballinacurra.	Midleton, ... Co. Cork.	Good limestone loam. Subsoil friable yellow clay.	1902, Potatoes, with farmyard manure. 1903, Barley.	Nov. 10th, 1903.
2. W. B. Nunn, Castlebridge.	Wexford, ... Co. Wexford.	Light sandy loam, Subsoil sand.	1901, Grass. 1902, " 1903, Barley.	Nov. 7th, 1903.
3. J. Kearney, Wilville.	Wilville, ... Co. Louth.	Good drift loam. Subsoil gravel.	1902, Oats. 1903, Potatoes, with farmyard manure.	Nov. 2nd, 1903.

NOTE.—All plots received 1 cwt. of sodium nitrate in the spring of 1904. Plot 2 received, in addition, 3 cwt. of superphosphate and 3 cwt. kainit in the autumn of 1903.

The following Table shows the yield per statute acre, value per barrel, and the value of the produce per statute acre:—

Yield per Statute Acre.				Value per Statute Acre.	Screenings.	Bushel Weight.
	Barrels.	Stones.	s. d.	£ s. d.		
1.	7	1	at 12 6	4 8 3	-	-
Screenings,	1	13		0 13 0	23 0	45 lbs.
Total, .	8	14		5 1 3		
2.	6	15	at 13 0	4 10 3	-	-
Screenings,	-	10½		0 5 0	9 0	48½ lbs.
Total, .	7	25½		4 15 3		
3.	13	8	at 12 9	8 13 8	-	-
Screenings,	-	4½		0 2 0	1 9	50½ lbs.
Total, .	13	12½		8 15 8	-	-

Previous results:—

1902. Ballinacurra.—Yield, 6 barrels 12 stones per acre.  
Value, £4 1s. Yield much reduced by smut and birds.

1903. Ballinacurra.—Yield unreliable owing to the damage after cutting by the storm of September 10.



*Notes.*

In favourable seasons this variety would be sown in October, but the wet season of 1903 rendered attempts to cultivate the land and prepare the seed-bed in a satisfactory manner an impossibility. The corn was not sown until about the first week in November, and even then under most unfavourable conditions. It came away well at first, but was badly beaten down by the incessant rains of December, January, and February. An application of 1 cwt. of Sodium Nitrate in the spring hastened the growth, but at the best only a moderate crop could be expected.

The grain when threshed was very poor, badly filled, and below malting standard. Except at Centre 3 the yield was very low and the percentage of screenings high. The superiority in yield at this centre may be attributed to the fact that the previous crop was potatoes, and the land was cleaner and cultivated at an earlier date than was the case at the other two centres.

**CHARLOCK, ALSO CALLED PRESHAUGH AND CORNKALE.\***

An immense amount of damage is done not only to corn crops but to all other crops in a rotation by this weed. Belonging to the same order of plants as the turnip, it acts as a host to the turnip fly before the turnip seeds have germinated, thus feeding the pest at a period when scarcity of food would result in its destruction. It also harbours the equally destructive turnip pest—Finger and Toe.

Indeed, if only to rid the land of these two pests, the eradication of Charlock is desirable, but in the corn crop especially, its presence causing in all cases a reduced crop, and not infrequently a total failure. The best period at which to attempt the destruction of this weed is when a corn crop occupies the ground, for it is then that it may be most thoroughly and economically done away with. Not only is a better grain crop then obtained, but the labour and expense of raising and cleaning subsequent crops are very materially reduced.

The non-appearance of Charlock in lea land may lead to the erroneous idea that it is destroyed. The seeds are plentiful, and, containing a high percentage of oil, will remain dormant in the soil for many years; but immediately the land is broken up again and favourable conditions present themselves the seed will germinate.

\* For treatment of this weed, see the Department's leaflet, No. 6, "Charlock Spraying."

The decreased yields of barley this year may be partly attributed to the prevalence in large quantities of this weed in the corn fields, especially in Cork. During the past season the manual plots at Middleton, the variety plots at Centres 1 and 2 in County Cork, and at Centre 6 in County Wexford were sprayed with a solution of Copper Sulphate to kill the Charlock with which they were infested. In all cases the results were successful, and the operation may safely be recommended to farmers as a means of banishing this troublesome and harmful weed from their tillage land. After spraying, the barley came away more quickly, and assumed a stronger and healthier appearance. A calm, dry day is essential to carry out the work successfully, and if the spraying is followed immediately by rain it should be repeated. In the case of a badly-affected crop a second spraying is recommended at an interval of one day, but in all cases the work must be carried out before the Charlock comes into flower and when the corn is from three to four inches high.

The spraying solution can be conveniently made up in a paraffin barrel which holds about 40 gallons of water. Sixteen pounds of Copper Sulphate, which before using should be finely ground, are dissolved in a wooden bucket in a gallon of water taken from the barrel. When all the salt is dissolved the solution is returned to the barrel and stirred with a long stick until the whole of the liquid is thoroughly mixed.

If a larger vessel than a forty-gallon barrel be used, the total quantity of water should be ascertained and 4 lbs. of Copper Sulphate added for every 10 gallons of water. A gallon of water weighs 10 lbs., thus 4 lbs. of sulphate in 10 gallons of water means 4 lbs. of salt to 100 lbs. of water, or 4 per cent., which is the strength of the solution required.

Care must be exercised that all the water used be free from dirt, as the holes in the nozzle of the sprayer are small and very apt to become choked if any dirt be present, thus wasting much time and material. For this reason the water should all be run through a fine strainer, preferably a linen one.

The knapsack sprayer, now commonly used for spraying potatoes, may be employed. The operator should first of all spray along the whole length of the field, and when he has ascertained exactly how much land he can cover with one tinful he should have the barrels placed at such a distance from each end

of the field as he finds most convenient. About 60 gallons of the solution are applied per acre. Wooden vessels must be used for all purposes in connection with this work, as iron ones are destroyed by contact with Copper Sulphate. The pump of the sprayer must be worked so as to produce as fine a spray as possible, and it should be remembered in this connection that the whole object of the operation is to cover each leaf of the Charlock with a thin coating of the liquid rather than to water the roots of the plant.

Copper Sulphate can be obtained through any manure merchant, and varies in price from 2s. 6d. to 3s. per stone. It should always be purchased with a guarantee of 98 per cent. purity. One man will spray  $1\frac{1}{2}$  to  $1\frac{1}{2}$  acres per day, or with an assistant to refill his sprayer,  $1\frac{3}{4}$  acres.

The total cost per acre will be from 6s. to 7s.

*Copies of this article in leaflet form (No. 36) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.*

## ART-TRADE SCHOOLS IN GERMANY.

A Report\* on the industrial-art schools of Germany, prepared by Dr. Frederic Rose, His Majesty's Consul at Stuttgart, has recently been issued. In the course of his report Dr. Rose states

that the movement for the founding of  
**The founding of** art-trade schools in Germany may be  
**Art-trade Schools.** assumed to date from the great London  
 Exhibition of 1851, and to owe its inception  
 and development to two principal factors: the desire to compete  
 with France in the production of artistic wares, and the endeavour  
 to succour many handicrafts, menaced in their existence by the  
 universal adoption of machinery, by gradually transforming them  
 into art-trades.

Considerable attention had already been devoted to instruction  
 in art-trade drawing during the eighteenth and the beginning of  
 the nineteenth centuries upon the occasion of the establishment of  
 drawing, art and trade schools, and during the latter-mentioned  
 period the question of art-trade instruction had been inscribed  
 upon the programme of the numerous industrial and polytechnic  
 associations founded for the promotion of industrial development.

But the ultimate aim of all these endeavours lay more in the  
 direction of technical efficiency than artistic finish; the instruction  
 given was devoted principally to the inculcation of the mathe-  
 matical, scientific, and commercial knowledge necessary for the  
 progressive requirements of modern industrial life. Concurrently  
 with this, the greatest attention was paid to accuracy in construc-  
 tive drawing, to the adoption of new and improved methods of  
 manufacture; the final aim being always the endeavour to replace  
 foreign-manufactured goods by the products of home industries.

As a natural result of this policy, interest in art, the for-  
 mation of taste and the production of wares not solely tech-  
 nically perfect but combined with artistic finish, were relegated  
 to the second place; it was considered more necessary to  
 produce a generation of skilled "Techniker" than a generation  
 of technically skilled artists. These views appear perfectly natural  
 when the condition of the German States during the period fol-  
 lowing upon the Napoleonic wars is taken into consideration; the

\* Report on Art-trade Schools in Germany. Cd. 2237-2.—1904. Price 4d.

reaction and exhaustion were so great, the lack of capital and economic misfortune so widespread, that few were in a position to embellish their homes and surroundings by the acquisition of artistically-wrought goods.

The first country to profit by the lessons inculcated by the London Exhibition of 1851 was the United Kingdom, where the creation of the Department of Science and Art and the South Kensington Museum marks the first systematic attempt to place the art-trade

**Some Results of the London Exhibition of 1851.**

industries of the country upon an independent national basis, and to promote and control their development. The means adopted towards this end included the formation of collections of representative products of the art-trade industries, the holding of lectures on art and on industrial art and technology, the establishment of instruction workshops, the extension of instruction in drawing and modelling, the public recognition of distinguished work, and other measures.

Germany was not slow to profit by the United Kingdom's example, and her art-trade schools and museums founded during the latter half of the past century have followed British models to some extent; at the same time, however, they have been developed upon the basis of the educational views prevailing in Germany; one of their distinguishing features being the promotion of intimate relations between the aims of the schools and the needs of the local and district art-trade branches of industry.

The art-trade schools of Germany are generally divided into preparatory classes and special classes for the different branches of art-trades. In many cases evening continuation classes for general subjects of instruction and for special instruction in art-trades are attached,

**Some Account of the German Art-trade Schools.**

evening and Sunday schools for drawing being also found. The instruction in the art-trade schools is given to a great extent in the day-time, and the connection between the day and evening classes of the same institute—where such exists—is sometimes of a loose, sometimes of a more intimate character, having been determined by local requirements, financial conditions, gradual development, and other considerations. Where the art schools are combined with drawing and artisans' schools a much larger amount of evening instruction is given. The present article, however, is concerned principally with the day instruction of the art-trade schools.

The instruction in the preparatory classes includes drawing of ornaments from charts and plastic examples, drawing and painting of objects from the animal, vegetable and mineral worlds, modelling of ornaments and figural objects, knowledge of projection, shading, anatomy, history of art, methods of drawing instruction, and so forth.

The special classes only admit pupils who have acquired a certain measure of preliminary artistic training either in the preparatory classes or elsewhere. They are often attached to studios or instruction workshops, and are generally divided into several principal groups accordingly as they devote special attention to architecture, sculpture, painting, and the multifarious branches of minor art.

The number of these classes is not fixed, but additional workshops and studios are added from time to time according to the development and requirements of the art-trades in the towns in which the schools are situated, or in the surrounding districts. The departments and classes generally include architectural drawing, engraving, chasing, wood-carving, decorative painting, pattern drawing and designing of all descriptions, enamelling, art metal-work, etching, art embroidery and lace-making.

The development of the German art-trade schools is still progressing, and as many of them are still in the experimental stage of their existence, the details of their internal equipment and organisation are consequently by no means settled. It is most noteworthy that they closely observe and study British methods and equipments of art-trade instruction, and adopt without reserve whatever they find adapted to their own conditions and environment.

Art-trade instruction in Germany is by no means confined to the art-trade schools. Certain branches of art-trades are taught in special schools of a separate, independent nature, which generally confine themselves to instruction in one particular branch. In this connection the textile technical schools, the special schools for the ceramic industries, the schools for the wood-working industries, the schools for special branches of the metal industries may be mentioned. A certain amount of art-trade instruction is also imparted in the building-trade schools\* and in the architectural faculties of the technical universities. Other schools giving

\* See *Journal*, Vol. IV., No. 4, pp. 677, *et seq.*

a certain measure of art-trade instruction also exist, and prominent amongst these are the trade schools.

The general aim of the art-trade schools is, briefly, the application of art to industry—the endeavour to impart method, and to develop the faculties for the utilisation of the graceful and harmonious in Nature, in the production of the ordinary practical objects of trade and daily use. To durability and serviceability, the two cardinal principles necessary in the production of goods, are to be wedded grace of form and harmony of colour. The art-trade worker must not be a mere mechanical producer of useful wares, but must imbue his work with the sense of the beautiful drawn from the measure of his own talent and his contemplation and interpretation of the great book of Nature.

The art schools, also, impart a large measure of instruction in art applied to industrial purposes (art-trade instruction) in addition to the ordinary instruction in pure art (painting and sculpture). It is very difficult to draw a sharp line of demarcation between art schools and art-trade schools, as the instruction given by the one category frequently encroaches upon the instruction given by the other; for practical purposes it is best to be guided by the names borne by the schools. The art-trade schools stand on a higher artistic level than the combined art-trade and artisans' schools. They stand in closer connection to pure art, and endeavour to train technical artists not art-skilled artisans. The art-trade schools also endeavour to give their instruction in the day-time to full-time pupils, whilst the combined art-trade and artisans' schools lay greater stress upon evening instruction.

It is not possible here to give a detailed account of each of the German art-trade schools. Neither is it necessary, for a good general idea of the organisation and work of these schools can be obtained from a study of the policy and methods of the art-trade school at Mainz.

#### **The Art-trade and Artisans' School at Mainz.**

This school is connected with an artisans' school and an evening school for drawing and modelling. It was founded in 1841 as an artisans' school. With the aid of the proceeds of some small industrial exhibitions and of private munificence a special school building was erected in 1878. Additions to this building have been made from time to time, and the school is now a very large

one. The art-trade school was separated from the artisans' school in the year 1879 with the name of "Public Drawing Hall," and was given a special curriculum and director; in the year 1894, however, they were again re-united under the management of one director.

The general organisation of the combined art-trade and artisans' school is as follows:—

Department I.—Preparatory school: Lower class, one half-year; upper class, one half-year.

**The Art-trade School** Department II.—Special schools for (a) Architecture (building construction and decoration); (b) interior decoration (petty art, ornamentation, artistic door fittings); (c) cabinet-makers, carpenters and furniture designers; (d) decorative painting; (e) modelling and chasing; (f) ceramics; (g) graphic art; (h) wood-carving.

The full courses in these eight departments, last three years, composed of six classes of one half-year each.

Department III.—Workshops of the special schools for: (a) Wood-carving and veneer-cutting; (b) plaster moulding and modelling; (c) decorative painting; (d) ceramics; (e) etching, lithography; algraphy; (f) chasing and leather-carving.

Department IV.—For women and girls: (a) Participation in the work of the special schools mentioned above (b) single instruction, for those who can only spare a few days per week, in drawing, painting, modelling, &c.

In the artisans' school there are two departments, and the work is divided as follows:—

Department I.—(a) Drawing. Preparatory and special classes for carpenters, joiners, furniture-makers, masons, stone masons, printers, compositors, decorative painters, locksmiths, mechanics, engineer foremen, carriage builders, tinsmiths, modellers, sculptors, goldsmiths, &c.; (b) evening continuation school, instruction in arithmetic, German, geometry, book-keeping, mathematics, statics, algebra.

The drawing instruction is given on Sundays and must be attended by all pupils.

Department II.—Trade school for: (a) Workmen engaged in building; (b) decorative painters.

The full courses last three years, composed of half-year or whole-year classes.



The work of the evening drawing and modelling school includes  
**The Evening Drawing and Modelling School.** drawing and modelling from the nude, figure drawing, ornament drawing, general art-trade drawing, &c.

The instruction in the art-trade school is given during the day, with a few hours in the evening in special cases. The instruction in the artisans' school is given in the evenings and on Sunday mornings. The instruction in Department II. of the artisans' school—for workmen engaged in building and for decorative painters—is given during the day, but only in the winter months.

The school is placed under the supervision of the Ministry of the Interior through the direct intermediary of the Trade Central Bureau. It is managed internally, and represented externally, by a Director, assisted by an advisory Board, including the Mayor of the town, a representative of the Government, and various delegates of the art-trades concerned, the latter being mostly members of the Mainz Industrial Association. The eight special divisions of the art-trade school are managed by eight professors, master workmen or special masters, who conduct the instruction of their particular divisions in accord with the Director, and who are responsible to him for their condition and progress.

The Mainz art-trade school, which has developed along the lines of local requirements and conditions, aims at  
**Aim of the School.** imparting the necessary artistic knowledge and ability for the successful prosecution of the various branches of the art-trades of Mainz and the surrounding districts. It aims more especially at imparting that measure of special knowledge which cannot be adequately acquired during the ordinary terms of apprenticeship in art-trade workshops; for this reason a suitable period of previous practical work is made a condition of entrance to the school, and pupils without this qualification, even if they have passed through the preparatory classes, are required to remedy this deficiency by undergoing a period of practical work before entering any one of the eight special art-trade divisions.

In pursuance of the general aim of the school the multifarious branches of the art-trades have been combined and reduced to eight special divisions, and special drawing courses have been arranged for general art-trade draughtsmen, pattern drawers, furniture designers, building draughtsmen, decorative painters,

wood-carvers, modellers, workers in artistic door fittings, goldsmiths, chasers, engravers, persons engaged in the ceramic industries, artists in glass-work, upholsterers, decorators, lithographers, sculptors, and others.

Several of the special divisions have been provided with workshops in order to facilitate a thorough practical instruction in addition to the training in drawing and general artistic principles. The school is also entitled—under certain conditions—to grant diplomas enabling the holders to teach certain branches of art trades, and it also undertakes the training of future masters and mistresses of freehand and art-trade drawing.

It is noteworthy that special attention is devoted to moderately-gifted pupils, and that pupils who do not possess a sufficient measure of the artistic faculty are not admitted to the school.

The instruction in the preparatory department of the art-trade school is—as the name implies—entirely of a preparatory nature, whilst that given in the eight special schools of Department II. is partly of a preparatory nature, but principally specialised for the particular branch in question; the curriculum in the preparatory school is the same for all pupils, but special plans of instruction have been arranged for each of the eight special branches.

Department IV. of the art-trade school is intended for women and girls who wish to perfect themselves in drawing in order to become draughtswomen and teachers of drawing, or for the purposes of any particular branch in which they may be engaged.

The aim of the artisans' school is to provide general and special instruction in drawing, practical instruction in modelling, finishing, with special courses for apprentices, journeymen, and master workmen in the different branches of art-trades. The evening continuation school, which is attached to the artisan's school, aims at giving general instruction, and includes, besides the subjects mentioned above, such subjects as plane and solid geometry, natural science, mechanics, estimates, historical development of various trades, and so forth; to these, instruction in Latin, Greek, French, and English is to be added for the benefit of printers and compositors.

The evening drawing and modelling school is completely separate from the day school (art-trade school) and is intended for all those whose occupations do not permit of attendance at the day school, and for such pupils who only attend part of the day instruction;

for these latter the evening drawing and modelling school is compulsory in order to prevent them from lagging behind and impeding the course of the instruction. It is also compulsory—for certain subjects—for all pupils of the preparatory school and for all backward pupils of the art-trade school. The evening drawing and modelling school may be therefore generally regarded as an extra tuition course for the art-trade school.

The following remarks apply only to the art-trade school:—

The pupils are divided into two principal classes, ordinary and extraordinary pupils. Pupils for the preparatory school must be at least 14 years old, and have completed the course of the elementary schools; pupils for the special branches of the art-trade school must be at least 15 years old, and must produce proof of artistic talent and training. The sole difference at this art-trade school between ordinary and extraordinary pupils consists in the fact that the former attend during the whole week, the latter at least three days per week.

The fees are payable in advance, and amount to £1 16s. per half-year for pupils of the preparatory school and the eight special branches and the women and girls' department, and to 5s. for the evening modelling and drawing school; extraordinary pupils pay 4s. per half-year extra fee, and all pupils pay an entrance fee of 3s.

Indigent pupils may be wholly or partially dispensed from the payment of fees. This dispensation runs from term to term (half-year), and is only awarded to diligent and capable pupils.

A small number of scholarships (Stipendia) are also available, but, as is usual in Germany, the amounts are insignificant compared with those available in the United Kingdom.

In the following synopsis of the course of study the details of the subjects of instruction are given, together with the number of hours per week devoted to the lectures, exercises, and practical work:—

**Details of the  
Subjects of Instruction.**

Subjects of Instruction.	Details of the Subjects of Instruction and Hours per Week for the Different Classes.
	<i>General Subjects of Instruction with written preparation of the Tasks.</i>
1. Plane geometry, ..	Preparatory Classes I. and II., 1 to 2 hours. Instruction from wall maps; point; line; areas; congruence, proportions, similarity, angle, circle, &c.
2. Calculation, ..	1 to 2 hours. Thorough repetition of calculations with measures and weights, calculation with vulgar and decimal fractions, exercises from business life; interest, company, partnership and mixed calculations; extracting square and cube roots.
3. Calculation of areas and bodies.	Preparatory Class, 1 to 2 hours. Angle, rectilinear figures, square, rectangle, rhombus, trapeze, triangle, Pythagorean theory, circle, ellipse, cube, prism, cylinder, pyramid, cone, sphere.
4. Arithmetic and algebra.	2 hours. Three grades for selected scholars; the four fundamental kinds of calculation with whole numbers; dissecting invoices, taking out the fractions, the four kinds of calculation with uneven numbers, powers, roots, logarithms, equations of the first grade with one and more unknown quantities, application of the methods of calculation to technical problems.
5. Statics, .. ..	(Selected scholars from the trade school) 2 hours, and 2 hours in the evening. Fundamental principles, composition and distribution of forces which are applied at one point, forces at different points of application; power and rope polygon, lever and static moment, bending movement and graphic statics.
6. German, .. ..	1 to 2 hours. Composition and correct writing, private and business letters, dictation, bills of lading, post-cards, postal advices, invoices, receipts, acknowledgments of debt, explanation of railway guide, pledge certificates, bonds, sole and first bills of exchange, map reading, &c., collective instruction.
7. Book-keeping, ..	Collective instruction, 1 to 2 hours. The following books are kept: day-book, cash-book, ledger, and inventory of a joinery and furniture store, a locksmith, or like business.
8. Economics, ..	1 to 2 hours. Embraces the constitutional and administrative law of the Grand Duchy of Hesse, and the most important matters in the constitution and legislation of the German Empire, old age and superannuation, insurance, &c.
9. Caligraphy, ..	1 hour. Exercises in writing with single and double pens; collective instruction; The pupils of all the classes must practise until sufficient skill is obtained.
10. History of art, ..	(Selected scholars). Lectures in the town library, in art collections, and in the school building. After a review of the history and development of painting and sculpture down to modern times, the separate periods are thoroughly dealt with, a complete picture of the respective artistic periods being combined with an exact description of the more prominent monuments and memorials. In addition to more detailed explanations of

Subjects of Instruction.	Details of the Subjects of Instruction and Hours per Week for the Different Classes.
<p>10. History of art—<i>continued.</i></p> <p>11. Building construction,</p> <p>12. Estimates of cost,</p>	<p><i>General Subjects of Instruction with written preparation of the Tasks—(continued).</i></p> <p>architecture, sculpture, and painting, attention is paid more particularly to art-trades and their technique. In order to explain the lecture, pictures from the town library or representations of the respective articles are exhibited to the scholars.</p> <p>(Trade school). Classes I. II. and VI., 4 hours. Lecture with diagrams; instruction in building materials, ground work, foundations, masonry, stone cutting, workshop, carpenters' work; brick bonding, wood bonding, general construction, roof ties, rafter joining.</p> <p>Classes III., IV., and V., 4 hours. Walls and roofs, truss work, suspension frames, roof coverings, tinsmiths', smiths', locksmiths', glaziers', and carpenters' work, heating, lightning conductors, &amp;c., vaulting staircases in wood, stone, and iron; stone cutting, simple iron constructions and their use in connection with lofty buildings.</p> <p>Classes III. to VI., 2 hours. (From details supplied). Estimates of quantities; calculations of building costs according to the number of square metres of the upper works, and according to the number of cubic metres; the calculations begin with the building plans, with each exercise where possible the corresponding estimates of cost, &amp;c., are made; in furniture, designing and cabinet work estimates of the material consumed, wages, &amp;c., are prepared diagrammatically and entered on the drawings.</p>
	<p><i>Special Subjects of Instruction with written preparation of the Tasks.</i></p> <p>13. Geometrical drawing.</p> <p>Lower classes. (A) Geometrical constructions, 8 hours in the daytime and 2 in the evening. Scales circle, polygon, ellipse, helix, oval, parabola, hyperbola; prolonged and abbreviated cycloid; Gothic tracery, trefoil and triangle, two, three, four and five-branch figures, &amp;c., trellis work, composite arch, rising arch, pointed arch with distribution of joints, ogee arch, horseshoe arch, trefoil arch, scales, brick joints, architectural diagrams, &amp;c. (B.) Drawings to scale; concentric circles, intersecting circles, guilloche ornament, shading exercises as substantial basis for further exercises in handling the pen; further simple site plans and simple isometrics such as cube, prism, pyramids, cylinder, dome area, diagrammatic screws, rivets, chains, tools, &amp;c. Rarely from copies, all from the teacher's explanations. Instruction in groups.</p> <p>14. Geometrical ornamentation.</p> <p>Square, triangle, angle; block letters; exercises in drawing simplest flat patterns with quadratic ground division; ribbon twining, meanders, mosaics, lace patterns; application of a few body colours: black, cinnabar, gold, blue; flat design,</p>

Subjects of Instruction.	Details of the Subjects of Instruction and Hours per Week for the Different Classes.
	<p align="center"><i>Special Subjects of Instruction with written preparation of the Tasks—(continued).</i></p>
14. Geometrical ornamentation— <i>con.</i>	<p>with acute angled division, triangulation, triangle and polygon division, flies, star figures, borders, Persian pattern, floor pattern, flat ornaments composed of circles, and network; notched edge patterns; wrought iron lattice work, glass mosaics, ceiling and wall divisions, compartments, &amp;c. Mostly from the teacher's explanations, not from copies. Instruction in groups.</p>
15. Descriptive geometry,	<p>Class I., 8 hours in the daytime, 1½ hours in the evening. Projection of a point, of a line, of a flat-edged area, of bodies; ascertaining the true length of straight lines and the actual form of flat areas from projections; sections, reticulations and developments; perforation of bodies, with constant consideration of the requirements of industrial practice; application of projection to architectural and industrial art forms, such as brackets, vases, columns, &amp;c., with application of simple ornamentation to their surfaces; channel endings, abbreviated mouldings, pearl strings, egg moulding, application of ornamentation to wood channels and balusters, twisted columns, isometric extensions. Instruction in groups.</p>
16. Instruction as to light effects.	<p>Classes II. and III., 4 hours daily, 1½ hours in the evening. Class II. General information as to light and shade effects; shades and shadows; shadows of the best known bodies and groups of bodies, shadow edges in rotary bodies, their shading. Class III. Lines of similar lighting; application of the instruction on light and shade effects to practical examples; mouldings; gambrial roofs, staircases, architectural details, niches, vases, &amp;c.; instruction in groups without copies. The tasks are previously constructed by the teacher on the wall diagrams or on the blackboard.</p>
17. Perspective, ...	<p>Classes IV., V., and VI., 4 hours in the daytime. (a.) Central perspective; plan of arrangement, eye level, ground level, picture plane horizon, point of sight, distance point, vanishing point, constructing the plan from a given perspective. (b.) Perspective with application of chance vanishing points; oblique position; distance; practical application. (c.) Aerial perspective; free perspective; inaccessible vanishing points; perspective rule and other instruments; bird's-eye view. Instruction in groups and separately. From the commencement it is expected that subjects will be treated pictorially in colour or pen and ink.</p>
18. Instruction as to profile.	<p>4 hours in the daytime, Preparatory Classes I. and II. Instruction on architectural forms directly connected with the exercises in geometrical drawing, as far as these forms are applicable for art-trade purposes. First, studies of single profiles having regard to object, size, and material of the articles, vases, pedestals, frames, base and belt mouldings, balusters, crosses, column base and Tuscan capital, brackets; Ionic capital. Instruction in groups.</p>

Subjects of Instruction.	Details of the Subjects of Instruction and Hours per Week for the Different Classes.
<p style="text-align: center;"><i>Special Subjects of Instruction with written preparation of the Tasks—(continued).</i></p> <p>19. Architectural drawing.</p> <p>20. Instruction in ornamental forms.</p>	
	<p>8 hours in the daytime for each Class I., II., III., IV., (V., VI.). Class I. The column, the entablature and its proportions, scale; Tuscan and Doric order of columns, base and belt mouldings, simple door and window forms. Instruction in groups. Class II. Ionic order of columns; capital, corner capital, temple frieze, chimneys; door posts; position of arches; Corinthian order of column and composite columns; positions of columns and arches; capitals and temple elevations; various positions of superimposed columns; Roman details. Classes II., III., and VI. (as V. and VI.). Fountains, tombstones, balcony, gable, façades, and façade details in various styles, brick and wood architecture; modern architecture; Gothic details. Classes V. and VI. Original designs for small decorative architectural constructions, porches, monuments, fountains, tombstones, façades, stress being laid on good technique in oil or water colours; further elevations of monuments and the like. Instruction in groups and separately. The object of the instruction is, in addition to learning the details, to bring before the eyes monumental construction and harmonious architectural proportions, and also in the upper classes to give an insight into the forms of construction and the systems of decoration of various styles of architecture. Special stress is laid on first-class technique. Use of the drawing pen and Indian ink, treatment in colour accentuating and setting off the drawing by means of background, &amp;c.</p> <p>Preparatory Classes I. and II., and Classes I., II., III., IV., V., and VI., for each class 4 hours in the daytime. Class for practising the instruction as regards styles; drawing the principal decorative forms which are employed in art-trades from systematically arranged examples of the various periods of style, types of plants, animal forms, conventional forms, heraldic representations, samples of material, &amp;c.; method of representation: with lead pencil, drawing pen, quill pen, steel pen, camel's hair pencil, more rarely in colour, generally in a sketchy manner. Instruction separately and in groups. The drawings are always so altered, in scale or method of representation, so that no direct copying is possible, and the reproduction of the original must always be executed differently. Preparatory Classes I. and II., 4 hours. Flat ornamentation; the tendril and the leaf in relation to its use in wrought iron work, lattice work, veneers, architectural elements, heart-shaped leaf, leaf stalk, pearl bars, palmettos, facing bricks, stele, simple forms of vessels and shields. Class I., 4 hours. Acanthus leaf, acanthus tendril in all kinds of styles, use on the capital, frieze, filling, shields and scrolls, glass windows, vessel supports. Class II., 4</p>

Subjects of Instruction.	Details of the Subjects of Instruction and Hours per Week for the Different Classes.
	<i>Special Subjects of Instruction with written preparation of the Tasks—(continued).</i>
20. Instruction in ornamental forms— <i>continued.</i>	hours. Flowers and leaves; lily, rose, thistle, palm, wreath of flowers, and flower tendrils, natural and conventional ornaments according to Aldegrevier, Flötner, &c.; escutcheon, drapery. Class III., 4 hours. Human and animal forms and their use in ornamentation; sphinx, lion, eagle, heraldic animals, arms, pageants, the human figure in ornament. Class IV., 4 hours. Industrial artistic, and decorative designs with special reference to the present technical school; posters. Classes V. and VI., 4 hours, same as Class IV.
21. Freehand drawing.	Classes I., II., III., IV., V., for each Class 4 hours in the day and 1½ hours in the evening. Preparatory classes. Class I. Copying models in various ways; flat ornamentation. Class II. Drawing from Nature casts, and living and dried plants, various methods of treating plaster models, partly in outline, partly in full light and shade effects. Classes III., IV., and V. Reproduction of more difficult ornaments from models or photographs, &c., in crayon, red chalk, pen and ink, water-colour. Individual instruction.
22. Figure drawing and anatomy.	Classes I. to IV., for each class 4 hours and 1½ hours in the evening. Class I. Parts of the face in outline, or with shading in pencil from copies and plaster casts. Class II. Heads, parts of bodies in outline, or with shading in pencil, crayon, or the like, from plaster casts. Class III. Entire figures in various methods of reproduction. Classes IV., V., and VI. Heads and parts of bodies from plaster casts and head from the life, mainly in crayon, but also in red chalk, lead pencil, water-colour, pen and ink, instruction on the skeleton, the muscles and proportions of the human body, so far as their knowledge is of importance for artistic comprehension and correct reproduction of the human form, anatomical drawing from copies and models, drapery studies. Individual instruction.
23. Drawing from the nude.	(Selected scholars), 6 hours, three evenings from 7.45 to 9.15. Drawing from the life, in crayon and red chalk.
24 and 25. Drawing plants and flowers from Nature.	In summer 8 hours, in winter 8 hours, Preparatory Classes I. and II. Flower drawings from copies and Nature, in simple pencil, pen and ink, and water-colour. Classes I., II., III., IV., V., and VI. Flower drawing and painting from copies and principally from Nature and living flowers; at first simple pencil drawings and afterwards water-colour (transparent and body colour, distemper and oils); study of the separate parts of plants, &c.
26. Style, .. ..	4 hours, Classes III., IV., V., VI., and VII. Styles of flowers and parts of flowers; application for rows and ornamentation. In contrast to the instruction in ornamental forms, which teaches in ornament known kinds of style, the scholars are induced to make independent attempts at conventionalising known plants.



Subjects of Instruction.	Details of the Subjects of Instruction and Hours per Week for the Different Classes.
	<p align="center"><i>Special Subjects of Instruction with written preparation of the Tasks—(continued).</i></p>
27. Designing ornament,	4 hours, Classes IV. and V. The conclusion of the Preparatory courses is the designing of ornament. The pupil is taught, in given flat figures, that is to say particularly in a limited space and in a given material, to find, with the help of the teacher and assistance of copies, models of all kinds and his own studies, a suitable decoration which is not opposed to the use and construction of the article; designs for vases, and flags or bricks, stove tiles, dishes, headlines, glass mosaics and glass painting, veneers, fillings, &c., are made.
28. Painting in water-colours. Colour studies.	4 hours for each class. Exercises in copying, polychrome flat ornamentation of the various art periods, also educating the sense and taste for colour harmony and colour technique; transparent and body colours. Separate instruction. Preparatory Classes I. and II. Large and small limited areas; stars, meanders, embroidery patterns, borders, edgings, copying simplest flat ornamentation in all styles. Classes I. and II. Reproducing in colour given flat ornamentation, veneers, mosaics, &c. Class III. Copying ornaments in multi-coloured plastic method of representation; flowers, tendrils, masks. Classes IV. and V. Reproducing in colour given ornaments; colour sketches of self-designed decoration; sketches for interiors in religious and profane art; architectural forms, capitals, &c. Art-trade objects; backgrounds; landscape. The tasks are, in the upper classes, mostly executed in duplicate, one of them being gradually completed by the teacher in full view of the scholars, and copied in its various stages of development by the pupils.
29 and 30. Figure drawing. Drawing and painting from Nature.	4 to 6 hours, Preparatory Classes 4 hours, also Classes I. to VI. Instruction commences with drawing simple geometrical bodies and outlines such as prism, pyramid, cone, sphere, cylinder, cross, arc, profile, cornice, or moulding, forming columns in Indian ink, chalk and washes. To this is attached, in the case of individual instruction, the drawing of separate simple art-trade objects: vases of earthenware, majolica, clay, glass, caskets, musical instruments, arms, and appliances of all kinds, materials, conchs, plants; also painting small groups in water-colour; the whole still life in distemper and water-colour ("gouache" and transparent colour). Objects from the school's own collection and from the museum are employed. Instruction in groups and individually. In summer drawing and painting are practised from nature, from the collections in the Electoral castle, the Romano-Germanic museum, the Association for Research in Rhenish History and Antiquities, the Rhenish Natural History Society, the Association for Plastic Art, and in the side aisles of St. Stephen's Church and the Cathedral, which are particularly

Subjects of Instruction.	Details of the Subjects of Instruction and Hours per Week for the Different Classes.
	<p align="center"><i>Special Subjects of Instruction with written preparation of the Tasks—(continued).</i></p>
29 and 30. Figure drawing, &c.—con.	<p>suited for this purpose, as well as in other suitable places in the town and its neighbourhood. In winter the instruction takes place in the school building.</p>
31. Decorative painting,	<p>Classes I., II., and III., 8 hours each. Classes IV., V., VI., 12 to 16 hours. Technical studies in wall and ceiling painting with simultaneous acquisition and practical execution of the painting technique necessary therefor, in size, gum, distemper and oil painting, painting with casein paints on paper, wood, canvas, and Gobelin material fresco painting; exercises in painting large wall and ceiling spaces with reference to copies of Italian and modern German decorative painting. In addition to the strictly conventional styles of of painting the free decorative representation of trees, figures, animals, fruit pieces, &amp;c., as insertions in friezes, panels, &amp;c., is practised. Individual instruction. Class I. Exercises in the technique of painting and handling paint, mixing, sizing, gumming, &amp;c.; painting large smooth surfaces, lining and stencilling; in connection with this, reproduction of profile pieces in light and shade; mixing scales in various tints. Class II. Applying given flat ornamentation in various coloured tints as exercises in harmonious combination of colours, outline exercises, &amp;c. Class III. 8 hours. Painting from plaster models, plastic representations of the same in various shades of colour, grey in grey, bronze, gold, &amp;c. The above-mentioned exercises of Classes I., II., and III. are exclusively done in distemper. Classes IV., V., and VI. Reproduction of coloured plastic detail ornamentation from casts or copies; masks, decorative figures, flowers, fruit, &amp;c.; as application, panels, ceilings, and wall details, as well as larger decorations, are executed partly from given motives and partly from pupils' own designs. A given time is fixed for fresco painting during the summer half-year's instruction, and the work is finished as far as possible without any interruption.</p>
32. Letter writing, ..	<p>2 hours. (a.) Simple script, skeleton, and block letters with partial construction. (b.) The more important kinds of lettering in the various styles, modern ornamental lettering, initial letters, monograms. (c.) Arrangements of text in shields, diplomas, &amp;c. Individual instruction. (d.) Designs for posters and diplomas, &amp;c.; copying posters, cards, &amp;c., with a view to their being printed. Instruction is, as a rule, imparted in combination with other instruction, for instance, in designing, in style, wall painting, &amp;c.</p>
33 and 34. Industrial art drawing and industrial art designing and sketching.	<p>Classes I. to IV. 8 to 10 hours in the daytime and 1½ hours in the evening. In the first class the object of the studies is the constructive and decorative work of the cabinet-maker and carpenter, such as porches, and doors, windows, niches.</p>

Subjects of Instruction.	Details of the Subjects of Instruction and Hours per Week for the Different Classes.
<p>33 and 34. Industrial art drawing, &amp;c—<i>con.</i></p>	<p><i>Special Subjects of Instruction with written preparation of the Tasks—(continued).</i></p> <p>fireplaces and mantelpieces; brackets and cornices of all kinds, wall and ceiling tablets, door coverings, lattice work, picture frames, furniture of all kinds, room arrangements in geometrical and perspective designs. The principal stress is laid on thoroughly good methods of representation in pen and ink and water-colour. Larger details, more particularly wrought iron, in crayon, &amp;c. Separate instruction. In the second class the decorative work of the potter and goldsmith is especially dealt with; vases, cups, plates, jugs, table ornaments, goblets, drinking cups, caskets, rings, brooches, necklaces, lamps, and lustres. Individual instruction. The third class deals with the decorative work of the pattern designer and material designer; carpets, patterns of cloths, embroidery patterns, table covers, art glassware, also products of small industries; fans, sewing appliances, stove screens, caskets, engravings, veneers, mosaics, vignettes, flourishes, diplomas, ornamentation of all kinds, posters, &amp;c. Individual instruction. The fourth class is that of the art locksmith (artistic iron-work), and scholars in the architectural class also take part in it; the work embraces garden fencing, grave crosses, wall brackets, candelabra, stair banisters, window lattices, fanlights, &amp;c., and also locks and keys, lightning conductors, and weather vanes, &amp;c.</p>
<p>35. Furniture designing and details.</p>	<p>Classes I. to VI., 8 to 10 hours, and 1½ hours in the evening. Class I. commences with the enlarged application of simple forms of furniture construction from copies and scale drawings; for each task the sections are applied in full size, or half natural size; the drawings are simply treated; footstool, commode, table, chairs, wardrobes, bedsteads, church chairs. Class II. Similar with modifications from copies and models; higher class furniture, chairs, wardrobes, bedsteads, with details in natural size. Classes III. to V. Work in one-tenths from prints, sketches, and models; expensive furniture, writing tables, sideboards, wall covering, bedsteads, altars, glass cupboard, show furniture, mantelpieces, staircases (together with working drawings so far as is necessary for the pupils), elaboration of the drawings. Attention is mainly directed to construction, nothing is directly copied.</p>
<p>36. Carpentry, ..</p>	<p>(Trade school). Classes I. to VI., 4 hours. Principally intended for the special department of architecture and building construction, but the pupils of the three stages of the trade school take part in it; construction and decorative treatment of skirting boards, stair-tread profiles, staircase sides, staircase uprights, construction of all ordinary forms of wooden staircases, wainscoting, carpentered and lath doors, yard doors, carved doors, barn doors, fences, sawn boards, brackets and panels,</p>

Subjects of Instruction.	Details of the Subjects of Instruction and Hours per Week for the Different Classes.
	<p align="center"><i>Special Subjects of Instruction with written preparation of the Tasks—(continued).</i></p>
36. Carpentry—con., ...	<p>beam heads, windows and window shutters, shop windows with roll shutters, double windows, slide windows, French windows, fanlights, house doors, roof intervals, balconies, gables, glass cupboards. Details in half or in natural size.</p>
37. Drawing. Exercises in building construction.	<p>Classes I. to IV., 14 hours. Stone cutting, side walling, escarped walls, vaults, trompes, caps, &amp;c., wood joints, partition walls, lattice work walls, spring walls, beam laying, staircases, shed roofs or lean-to roofs, hipped roofs, saddle roofs, tower roofs (application of models), foundation work; small buildings with all plans and sections; stalls, agricultural buildings, &amp;c.; detached dwelling-houses, council chambers, dwelling and business houses with all working drawings.</p>
38. Exercises in designing buildings.	<p>4 hours. The designing with the help of the teacher, under his inspection and correction, deals first with the simplest building objects and progresses to more extensive ones, with special reference to the architects' plans, constructions and Mainz building regulations.</p>
	<p align="center"><i>Practical Handicraft Instruction.</i></p>
39. Wood-carving and making veneers.	<p>Classes I. to VI., 30 to 36 hours. Classes I., II., and III. Instruction in handling tools, workshop appliances; wood working; laying out flat patterns; ornamental bands; scallops, notching, volutes or scrolls, Gothic flat ornamentation, all from cut copies, leaves and tendrils in the flat style; turned volutes, acanthus leaves and tendrils of various styles in oak, lime, and walnut wood. Classes IV. and V. Brackets and column shafts with grooving, egg moulding bars, Ionic capitals, knots or buttons, all of simple form. Class VI. Curtains, fruit, flowers, friezes, panels, draperies, coats of arms, from drawings, photographs, plaster casts and own design. In carrying out practical work in furniture, tables, staircase pillars and banisters, the scholars take part according to the judgment of the instruction master and the Director. Every six months a given number of pieces of work in various styles are finished.</p>
40. Modelling ornaments,	<p>Preparatory Classes I., II., III., IV., V., VI., and VII., three half-days and four evenings, 1½ hours, and Sunday morning. Instruction is not limited to the copying of the simpler and more elaborate patterns which are first reproduced in similar scale and method of representation, and afterwards in modified scales in transferring from flat into plastic and from round into relief, &amp;c., but from the very first modelling is done from living plants. The modelling is not only intended to</p>

Subjects of Instruction.	Details of the Subjects of Instruction and Hours per Week for the Different Classes.
<p style="text-align: center;"><i>Practical Handicraft Instruction—(continued).</i></p> <p>40. Modelling ornaments—<i>con.</i></p> <p>41. Figure modelling.</p> <p>42. Modelling from life.</p> <p>43. Etching, engraving, algraphy, lithography.</p> <p>44. Ceramic studies.</p> <p>45. Leather cutting.</p> <p>46. Exercises in cutting paper hangings.</p>	
<p>prepare for successful attendance at the sculpture instruction, but mainly to afford opportunity to the pupils of other departments of understanding bodily forms and their action in ornament, and for practising plastic reproduction. Material: clay, plastilin, wax; modelling and casting in plaster. Separate instruction. Classes I. and II. Copying acanthus leaves and simple ornaments; flowers from Nature. Class III. Composition of ornaments from given motives. Classes IV., V., and VI. Rich ornamentation with half figures and masks; busts; making wax models from pupils' own designs prepared in the technical school; modelling in plastilin has been recently introduced for wrought iron work; lattice work; wall brackets, &amp;c. (modelling art door fittings); modelling flowers and fruit, shells, &amp;c., from Nature; flat relief on slate tablets, small models in wax and plastilin for goldsmiths and chasers, &amp;c. From the commencement, as far as possible, finished articles are modelled.</p> <p>Anatomical studies in round form and relief; whole figures executed on the flat, in high relief and in the round; making plaster and glue moulds, &amp;c.</p> <p>For adults only, three to four evenings from 7.45 to 9.15. Reproduction in relief and of figures in the round, in clay and plastilin in various scales.</p> <p>Classes III. to VII., 4 to 8 hours. Treatment of the material; various processes; etching ground; application of the drawing; point engraving; treating the plates and articles with acids; handling and applying the colours or inks; printing proofs in own presses; material: zinc, copper, tin, stone, aluminium, spotted toned plates, linoleum.</p> <p>8 hours, newly arranged 1902. Work on the potter's wheel; decoration of vases in relief ornament and engraving; slip painting, biscuit painting; firing the scholars' own articles in the furnace belonging to the institution; glazes and their preparation; plastin painting is utilised as preparation for slip painting.</p> <p>4 hours. Exercises in cutting, punching, and embossing leather; utilisation of leather for useful articles; dyeing, gilding, and painting the articles made.</p> <p>In each six months a class of from 40 to 50 hours is held for teaching manual dexterity and how to make draperies, at which class the scholars of the industrial art school of Class I. may share; instruction is obligatory for furniture designers and art carpenters; drawing and cutting the tasks in natural size.</p>	

Subjects of Instruction.	Details of the Subjects of Instruction and Hours per Week for the Different Classes.
<p>47. Modelling in lead (and plastilin).</p> <p>48. Majolica and porcelain biscuit painting, decorative painting, distemper painting, &amp;c.</p>	<p><i>Practical Handicraft Instruction—(continued).</i></p> <p>6 hours. For art locksmiths, chasers, and the scholars of the industrial art department a class is arranged in which models of smiths' work are made; sawing and embossing in lead, development of leaves and tendrils; composing ornaments and lattice work profiles.</p> <p>8 to 12 hours. Material: the usual colours, their treatment and the corresponding painting technique, simple colour tests and mixing tests; decorating articles and surfaces from own designs or from copies; finishing the work according to the technique.</p>
<p>49. Rapid designing, that is to say, preparation of a task in a limited time.</p>	<p><i>Introduction to Independent Working and Designing.</i></p> <p>Classes II., III., IV., V., and VI., 1 hour criticism, 4 hours. Each week for each class in all the technical schools, tasks are made out in proportion to the progress of the instruction, which are first thoroughly explained as regards their essential features, and determined as regards size and extent. These tasks are worked out and completed in a school room under closure in 3½ to 4 hours, without any help from the teacher; the tasks are delivered, provided with signature and distinctive name or word, and then judged according to design, execution and construction, and afterwards hung in the room and discussed. The tasks, although taken from all branches of the instruction of the art trade school, are in systematic connection. Instruction is arranged for Classes II. to VII. of all the special schools; thus, in addition to drawings, models in clay and plastilin are also made, only the time for modelling from own designs is increased to 8 hours. The entire arrangement has been successful and evoked eagerness and love for the development of independent ideas. 18 to 20 tasks are dealt with in each class, and prizes and diplomas are distributed for good work by way of encouragement. Occasional and outside students are also required to take part in the rapid designing.</p>
<p>50. Prize tasks, ..</p>	<p>Each technical school gives in each school half-year one prize task; all the scholars may take part in competing for this task unless special regulations, as regards certain classes and schools, exist. The works received are judged by the heads of the special schools and the Teachers' Council. The prizes awarded, together with the accompanying certificates, are presented by the Director at the conclusion of each school half-year, before the assembled scholars, in the presence of the teachers, advisory committee, and invited guests. At this opportunity the work sent in and the best rapid designs are publicly exhibited.</p>

Although the instruction in the art-trade school still corresponds generally speaking, to the programme previously drawn up for the school, yet alterations in the method of teaching, material of instruction, &c., take place every year. Formerly, following the tendency of the times, the study of the antique and earlier styles stood in the forefront of the instruction, and everything tended towards the attainment of as complete a knowledge as possible of the various styles. During the last few years, however, the cultivation of the individual's own style or characteristics is now taking a dominating position. The object of the study of the ornamental forms of the old style is no longer to create an apparent correctness in style by exact imitation of foreign styles and combinations of various correct motives of style; it is now generally accepted that a German cannot feel, think, and create, artistically, in the same manner as the Chinese and Indian, or a Russian like the Japanese, and that the man of the twentieth century cannot feel, create, and receive impressions like the man of the Gothic or Roman period. The study of the old styles, however, still gives and always will give an indication as to how art and art work have developed in accordance with the different feelings of different times and peoples, and it will always be its province to indicate and teach what each one should strive to attain in his own particular period and circumstances.

On the basis of this doctrine, and attaching due importance to the regular study of the surroundings, landscape, &c., as well as to Nature studies of the characteristics of plants, animals, and men, the school endeavours to educate the students of the school in independent work by the cultivation of their own styles; the awarding of prizes for personal designs assists the endeavours in this direction.

A very special object which the school seeks to attain is faultless artistic representation, which is demanded in all draughtsmen's work, and is even extended to the preparation of large details for the sake of practice.

As appears from the long existence of the workshops, the endeavour of the school has always been to cultivate instruction in manual dexterity. The independent construction of models embodying their own designs is intended to safeguard the students against a one-sided purely draughtsmen's instruction; it is intended at the same time to enable those art-trade designers who in future will be occupied more with designing than with the practical making of art-trade objects, to test the practicability of

their own designs and their effect when embodied. The work in the instruction workshops thus affords the students opportunities of ascertaining what special materials can be suggested, or what effects may be obtained by various methods of treatment, and generally speaking all productive advantages which instruction in manual skill affords are, as far as this is possible, utilised. In the instruction workshops the possibility of a complete artistic and practical manual training is also afforded.

The students in the architectural department of the school, therefore, make models or architectural forms in gypsum, cardboard, and saw-work; the furniture designers and art cabinet-makers work out their designs as sketch models in clay or plastilin, and share in the instruction in wood-carving, veneer cutting, etching wood, and other instruction in carpentry. The art-trade designers and lithographers etch in copper and zinc, engrave ornaments in various materials, make copper printing plates from their own designs and sketches, print with the same in the copper printing press, and practise drawing on stone, and algraphy; they model in clay and plastilin, or emboss, punch and cut leather, and execute work by the etching process. The ceramic designs of the pupils are also executed in the actual workshops; the pupils turn their vases or vessels on the wheel, glaze and fire them, paint them with slip painting, or with the casting horn, &c.

The workshop for wood-carving is being re-arranged, and workshops are being erected in the new workshop building for art smiths' work, metal embossing, chasing and engraving.

#### Attendance and Teaching Staff.

The attendances at the art-trade and artisans' school for a series of years were as follows:—

Year.	Attendances at the—		Total Attendances.
	Art-trade School (including the Evening Drawing and Modelling School).	Artisans' School.	
1894 ..	414	820	1,234
1895 ..	420	820	1,240
1896 ..	350	865	1,215
1897 ..	335	893	1,228
1898 ..	450	922	1,372
1899 ..	531	991	1,522
1900 ..	468	787	1,255
1901 ..	560	918	1,478
1902 ..	591	1,003	1,594
1903 ..	790	1,056	1,846



For this number of pupils a large teaching staff is provided, consisting of professors, masters, assistants, architects, engineers, painters, drawing masters, modellers, special technical masters, lithographers, and master workmen and representatives of the various branches of the art-trades:—

Department of the School.	Number of Professors, Masters, Assistants, &c.
The art-trade School, .. .. .	18
The artisans' school, including the Sunday drawing school,	27
The evening continuation school, .. .. .	8
The evening drawing and modelling school, .. .. .	19
Total, .. .. .	72

**Some Financial Details.** The total expenditure for school buildings, as they stand at present, must amount to about £23,000; this sum does not include all the interior equipment for the workshops.

The school is not self-supporting—this being evident from the low rate of fees charged—and is in receipt of the annual support indicated below:—

Source of Annual Support.	Amount.
	£
State, .. .. .	2,200
Town, .. .. .	1,000
District, .. .. .	50
District Savings Bank, .. .. .	60
Mainz Industrial Association (annual support), .. .. .	850
„ „ (extraordinary support), .. .. .	315
Miscellaneous, .. .. .	15
Total, .. .. .	4,490

Exhibitions are arranged at the close of every half-year, consisting of independent work done by the pupils, such as designs, prize-work, and models. These exhibitions are intended primarily for the masters and pupils, and to enable the advisory board and the members of the Town Council to test the work and progress of the school; from time to time, however, they are thrown open to the general public.

The school also exhibits, occasionally, at large industrial exhibitions, and places its rooms at the disposal of any exhibition of artistic designs which have been thrown open to public competition; in the latter case the Director of the school is generally a member of the jury.

Finally, it may be mentioned that the instruction given at the school is promoted and supplemented by the following collections, which belong to the school:—(1) Collection of plaster casts of all styles, casts of plants, animals, and the human figure, mostly prepared by pupils; (2) collection of charts, works on art, and photographs; (3) collection of art-industrial objects; (4) small collection of oil paintings; (5) collection of good work executed by former pupils; (6) the school greenhouse; (7) collection of models for locksmiths and mechanics; (8) collection of stuffed animals, of skeletons, shells, beetles, butterflies, crystals, cut and polished minerals, &c.; (9) collection of models for masons, joiners, &c.

In addition to these, the pupils have access to the following collections, where they are allowed to draw and hear lectures:—(1) The municipal library; (2) the collections of the "Plastic Association"; (3) various botanical, mineralogical, geological, and ethnographical collections; (4) collection of old artistic iron-work; (5) the collections of the municipal museums; (6) the collections of the Central Bureau for Trade at Darmstadt; (7) the municipal greenhouses.

The collections, which are not very numerous, are arranged in show cases in the passages. This seems to be a very good system, as the various objects are in this manner thrust upon the notice and observation of the pupils as they pass along, or linger in the passages.

The relations of the school with the art-trade industries of the town and neighbourhood are of the most intimate and cordial nature; it is, in fact,

**The School and the Trades' Associations.** practically, to the Mainz Trade Association that the school owes its foundation and maintenance.

Pupils who leave the school, after having completed the full courses of their departments, readily find occupations in all the branches of the art-trades. Constant inquiries are made at the school on the part of art-trade manufacturers desirous of acquiring fully-trained and skilled assistance. The school remains in this manner in close touch with the industries concerned, and is enabled to impress upon intending pupils the necessity of a period of practical work before joining the school.

Some idea of the part played by the art-trade schools in German industrial art may be obtained from the following table giving the number of masters and pupils at the art-trade schools. With some few exceptions the figures are those for the summer term 1902. They are therefore from one-third to

one-fourth less than they would be in the winter term, as many persons engaged in art-trades—especially painters and decorators—are engaged during the long days of summer, and prefer attending the schools in winter.

The teaching staff includes professors who devote their whole time to the school and masters who attend at stated times for certain subjects, further, assistants and heads of instruction workshops:—

SCHOOL AT—	NUMBER OF			Total Number of Pupils.	Remarks.
	Professors, Masters, &c.	Day Pupils.	Evening and Secondary Pupils.		
Aix, ... ..	42	—	839	839	180 female pupils. Includes female pupils.
Altona, ... ..	—	114	359	464	
Barmen, ... ..	27	52	403	455	
Berlin, ... ..	36	83	1,747	1,830	
Charlottenburg,	—	28	562	590	
Breslau, ... ..	22	211	208	419	
Cassel, ... ..	15	128	178	306	
Cologne, ... ..	16	44	391	435	
Dessau, ... ..	29	67	350	417	
Dresden, ... ..	20	141	325	466	
Düsseldorf, ...	14	88	70	158	
Elberfeld, ... ..	—	122	154	276	
Erfurt, ... ..	14	37	409	446	
Frankfurt-on-the- Main.	17	31	241	272	
Hanover, ... ..	60	159	2,317	2,476	Includes female pupils.
Karlsruhe, ... ..	24	—	—	311	
Königsberg, ...	18	6	106	112	
Magdeburg, ... ..	51	155	929	1,084	
Leipzig, ... ..	25	150	100	250	157 female pupils.
Mainz, ... ..	72	250	1,344	1,594	
Munich, ... ..	28	359	—	359	
Nuremberg, ... ..	16	150	84	234	
Pforzheim, ... ..	10	—	—	304	47 female pupils.
Strassburg, ... ..	14	222	—	222	
Stuttgart, ... ..	10	121	—	121	

The large art expenditure of the governments of the German States for the support of secondary, elementary, technical, and other schools is well known. The same liberality is observable in the case of the art-trade schools, and the efforts of the governments of the German States for the maintenance of the schools are ably seconded by the municipal authorities of the towns in which the schools are situated.

The following table gives the annual amounts received by the art-trade schools from the State, municipal authorities, and other sources; the total of these amounts, added to the income from fees, represents as a rule the total annual expenditure of the schools in question:—

TOWN.	Designation of School.	Income from Fees.	Source of Aid.	Amount
		£		£
Berlin, ... ..	Art-trade school, ...	1,500	State, municipal and other	6,750
Berlin, ... ..	School attached to the art-trade museum.	900	State, municipal and other.	7,642
Breslau, ... ..	Art and art-trade school.	550	State, ... .. Municipal, ... ..	5,470 100
Frankfurt-on-the-Main	Art-trade school, ...	240	State, ... .. Municipal, ... .. Polytechnic Association. Various sources, ...	1,200 450 2,700 200
Barmen, ... ..	Art-trade and artisans' School.	320	State, ... .. Municipal, ... ..	2,000 1,900
Elberfeld, ... ..	Art-trade and artisans' school.	350	State, ... .. Municipal, ... ..	2,150 2,500
Cologne, ... ..	Art-trade and artisans' school.	430	State, ... .. Municipal, ... ..	1,000 1,000
Aix, ... ..	Trade drawing and art-trade school.	730	State, ... .. Municipal, ... ..	1,325 1,175
Cassel, ... ..	Trade drawing and art-trade school.	600	State, ... .. Municipal, ... ..	1,925 1,150
Magdeburg, ... ..	Art-trade and artisans' school.	700	State, ... .. Municipal, ... ..	3,050 2,700
Erfurt, ... ..	Art-trade and artisans' school.	210	State, ... .. Municipal, ... ..	1,180 980
Hanover, ... ..	Art-trade and artisans' school.	1,110	State, ... .. Municipal, ... ..	3,250 300
Charlottenburg, ... ..	Art-trade and artisans' school.	310	State, ... .. Municipal, ... ..	1,940 1,860
Altona, ... ..	Art-trade and artisans' school.	570	State, ... .. Municipal, ... ..	1,740 1,400
Königsberg, ... ..	Art-trade school and trade school.	120	State, ... .. Municipal, ... ..	1,165 —
Düsseldorf, ... ..	Art-trade school, ...	500	State, ... .. Municipal, ... ..	3,725 1,940
Munich, ... ..	" " ...	400	State, ... ..	7,000
Nuremberg, ... ..	" " ...	—	" " ...	5,000
Dresden, ... ..	" " ...	525	" " ...	9,000
Leipzig, ... ..	Academy for the graphic arts and the book-trade,	380	" " ...	5,350
Stuttgart, ... ..	Art-trade school, ...	200	" " ...	3,700
Karlsruhe, ... ..	" " ...	—	" " ...	7,200
Pforzheim, ... ..	" " ...	—	" " ...	3,080
Mainz, ... ..	" " ...	—	" " ...	2,200
			Municipal, ... .. Various, ... ..	1,000 1,290
Strassburg, ... ..	" " ...	750	State, ... .. Municipal, ... .. Various, ... ..	1,150 1,700 250
Dessau, ... ..	Art-trade and artisans' school.	350	State, ... .. Municipal, ... ..	600 1,300

It is scarcely possible at present to utter a definite expression of opinion upon the relative merits and failings of the German art-trade schools, as many of these schools are of recent origin, and others have only lately been reorganised. The movement in favour of art-trade instruction seems to be still in an experimental and tentative stage, and some time must yet elapse before anything like uniformity is attained in the methods of instruction, or unanimity arrived at regarding the cardinal principles of art involved in art-trade instruction. Taken as a whole, with some exceptions, the art-trade schools have not attained the high-water mark of efficiency occupied by technical schools.

A weak point is the paucity of instruction workshops in some of the schools and the insufficient equipment and accommodation of the workshops already installed. This has been caused by the lack of the necessary funds, and by the failure to grasp the important rôle played by such workshops in art-trade instruction. These defects, however, are being rapidly remedied; the best proof of this being the large sums voted for new buildings and extensions, and the considerable annual subsidies granted by governments and municipal authorities for purposes of maintenance.

The art-trade products of Germany show much that is desirable and praiseworthy beside much that is wholly undesirable. But it is beyond reasonable doubt that the production of the former has been influenced by the art-trade schools, and that the production of the latter is due—partly to manufacture solely for purposes of profit, and partly to the indifference of an indiscriminating public. However, good taste and superior manufacture, the fruits of the spread of art-trade instruction, are gradually but surely prevailing.

## SPROUTING SEED POTATOES.

### LATE VARIETIES.

The successes which have attended the Department's experiments in sprouting potatoes for early markets have led them to consider whether the same method might not be advantageously applied to late or main crop-varieties. In 1903 trials between sprouted and unsprouted "seed" were carried out by the Agricultural Instructors for Antrim, Cavan, and North Tipperary. The varieties tested were *Champion*, *Flounder*, *Bruce*, *Up-to-Date*, *Black Skerry*, and *Abundance*. The soils varied in character from peaty to poor clay, but the cultivation, manuring and general treatment on each farm were the same for sprouted and unsprouted seed. In some instances the plots were sprayed, in others they were not, but the general results were not affected thereby.

In 1904 similar experiments were carried out at thirty-four centres in Antrim, Carlow, Cork, Cavan, Down, Londonderry, Sligo, Tipperary, and Wexford, under the supervision of the respective Instructors in Agriculture. Full information as to varieties, manuring, spraying, dates of boxing and planting, and yield is given on pp. 304 and 305.

### SUMMARY of RESULTS of Experiments on the Sprouting of Late Potatoes in 1903 (12 centres), and in 1904 (34 centres).

—	Yield per Statute Acre.				Average Increase per Statute Acre in favour of Sprouted Seed.	
	Sprouted.		Unsprouted.			
	T.	C.	T.	C.	T.	C.
1903	11	1	9	8	1	13
1904	11	6	8	13	2	13

The increase due to sprouting varied in 1903 from 10 cwt. to 3½ tons, and in 1904 from 13 cwt. to over 6 tons. There were slight decreases at one centre in 1903, and at two in 1904.

TABLE giving particulars of EXPERIMENTS carried out with a

Centre.	Variety.	Manures applied.	Sprayed or Unsprayed.
Ballydivity, Dervock, Co. Antrim, ..	Sutton's, ..	Farmyard manure and complete mixture of artificials.	Sprayed once, ..
Do., do., ..	Black Skerry, ..	do., ..	do., ..
Ballybitt, Tullow, Co. Carlow, ..	Champion, ..	do., ..	Not sprayed, ..
Knocklishen, Kiltegan, Co. Carlow, ..	Abundance, ..	do., ..	do., ..
Rigsdale House, Ballinhassig, Co. Cork, ..	Up-to-Date, ..	Farmyard manure and superphosphate.	do., ..
Do., do., ..	Langworthy, ..	Do., ..	do., ..
Carrickvilla, Stradone, Co. Cavan, ..	Champion, ..	Farmyard manure and complete mixture of artificials.	Sprayed once, ..
Do., do., ..	Up-to-Date, ..	do., ..	do., ..
Knockanask, Stradone, Co. Cavan, ..	Up-to-Date, ..	do., ..	do., ..
Knockatygart, Clifferna, Co. Cavan, ..	Up-to-Date, ..	do., ..	do., ..
Subaneeny, Blacklion, Co. Cavan, ..	Up-to-Date, ..	do., ..	do., ..
Polintemple, Virginia, Co. Cavan, ..	Champion, ..	do., ..	do., ..
Lake View House, Mountnugent, Co. Cavan, ..	Champion, ..	Farmyard manure, ..	do., ..
Glascar, Banbridge, Co. Down, ..	Black Skerry, ..	Farmyard manure and complete mixture of artificials.	do., ..
Corcreeney, Lurgan, Co. Down, ..	Black Skerry, ..	do., ..	Sprayed twice, ..
Do., do., ..	Up-to-Date, ..	do., ..	do., ..
Springhill, Lurgan, Co. Down, ..	Black Skerry, ..	Farmyard manure, ..	Sprayed once, ..
Do., do., ..	Up-to-Date, ..	do., ..	do., ..
Clandeboyne, Belfast, Co. Down, ..	Up-to-Date, ..	—	Not sprayed, ..
Do., do., ..	Evergood, ..	Farmyard manure, ..	do., ..
Do., do., ..	Maincrop, ..	do., ..	do., ..
Grove Hill, Dromore, Co. Down, ..	Up-to-Date, ..	Farmyard manure and special potato manure.	Sprayed once, ..
Do., do., ..	Champion, ..	do., ..	do., ..
Macleary, Coleraine, Co. Londonderry, ..	Bruce, ..	Farmyard manure and complete mixture of artificials.	do., ..
Do., do., ..	Bruce, ..	Farmyard manure with superphosphate and kainit.	do., ..
Boghill, Coleraine, Co. Londonderry, ..	Garton's, ..	Farmyard manure with superphosphate and muriate of potash.	do., ..
Castle Caulie, Mulnabreene, Co. Sligo, ..	Beauty of Bute, ..	Farmyard manure with guano.	Sprayed twice, ..
Do., do., ..	Up-to-Date, ..	do., ..	do., ..
Do., do., ..	Black Skerry, ..	do., ..	do., ..
Rockford, Nenagh, Co. Tipperary, ..	Empress Queen, ..	Farmyard manure with complete mixture of artificials.	Not sprayed, ..
Crosshue, Blackwater, Co. Wexford, ..	Beauty of Bute, ..	Farmyard manure, ..	Once sprayed, ..
Do., do., ..	Champion, ..	do., ..	Not sprayed, ..
Clonhaston, Enniscorthy, Co. Wexford, ..	Up-to-Date, ..	Farmyard manure with complete mixture of artificials.	Once sprayed, ..
Do., do., ..	Beauty of Bute, ..	Do., ..	do., ..
Average of 34 Centres.			

view to testing the advantages of planting **SPROUTED** POTATOES in 1904.

Dates of		Yield per statute acre from Sprouted Potatoes.			Yield per statute acre from Unsprouted Potatoes.			Increase due to Sprouting.
Boxing.	Planting.	Saleable.	Small.	Total.	Saleable.	Small.	Total.	
		Tons cwt.	Cwt.	Tons cwt.	Tons cwt.	cwt.	Tons cwt.	Tons cwt.
12th March,	28th Ap.	6 15	75	10 10	2 11	83	6 14	3 16
12th March,	28th Ap.	9 10	32	11 2	7 11	24	8 15	2 7
14th January,	4th May,	6 0	36	7 16	5 2	22	6 4	1 12
3rd Feb.,	15th Ap.	7 19	52	10 11	5 5	63	8 8	2 3
23rd Dec.,	11th Ap.	11 16	42	13 18	4 16	55	7 11	6 7
23rd Dec.,	11th Ap.	6 15	31	8 6	3 8	17	4 5	4 1
Oct., 1903,	9th May,	9 18	5	10 3	4 2	47	6 9	3 14
do.,	do.,	12 4	10	12 14	5 9	48	7 17	4 17
Nov., 1903,	9th May,	12 11	9	13 0	6 10	27	7 17	5 3
Feb., 1904,	11th May,	-	-	10 17	-	-	6 9	4 8
Dec., 1903,	10th May,	-	-	11 15	-	-	8 0	3 15
Feb., 1904,	7th May,	14 0	20	15 0	10 0	30	11 10	3 10
Feb., 1904,	29th Ap.	10 3	45	12 8	5 7	42	7 9	4 19
25th Jan.,	27th Ap.	10 9	11	11 0	8 10	11	9 1	1 19
26th Jan.,	30th Ap.	9 0	24	10 4	8 1	24	9 5	0 19
1st May,	20th May,	10 0	22	11 2	9 13	16	10 9	0 13
26th Jan.,	29th Ap.	6 17	16	7 13	6 0	16	6 16	0 17
do.,	do.,	8 9	15	9 4	8 9	24	9 13	0 9 (decrease)
30th Jan.,	5th Ap.	8 7	28	9 15	6 0	30	7 10	2 5
do.,	8th Mar.,	9 0	27	10 7	6 0	17	6 17	3 10
do.,	do.,	4 10	18	5 8	3 1	17	3 18	1 10
23rd Jan.,	27th Ap.	11 17	24	13 1	9 10	11	10 1	3 0
do.,	do.,	10 3	15	10 18	7 16	31	9 7	1 11
8th March,	25th Ap.	9 8	14	10 2	8 10	12	9 2	1 0
8th March,	30th Ap.	11 2	18	12 0	11 10	18	12 8	0 8 (decrease)
12th March,	23rd Ap.	14 3	25	15 8	12 16	21	13 17	1 11
4th Jan.,	15th Ap.	9 14	64	12 18	7 8	46	9 14	3 4
do.,	do.,	10 5	69	13 14	9 4	64	12 8	1 6
do.,	do.,	9 12	38	11 10	6 13	29	8 2	3 8
21st Oct., '03,	26th Ap.	7 15	35	9 10	4 11	28	5 19	3 11
27th Feb.,	20th Mar.	8 4	32	9 16	7 2	36	8 18	0 18
do.,	15th Ap.	5 7	80	9 7	5 3	48	7 11	1 16
27th Feb.,	23rd Ap.	14 11	38	16 9	12 7	16	13 3	3 6
-	do.,	15 8	25	16 13	11 8	7	11 15	4 18
-	-	9 15	31	11 6	7 8	80	8 18	2 18



It will be seen from the table that as a result of sprouting—

(1.) An increased yield averaging 2 tons 13 cwt. per acre was obtained, representing over 25 per cent. on the average crop from unsprouted seed.

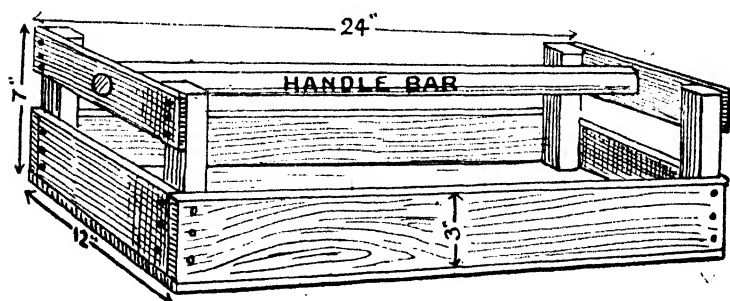
(2.) Only in two cases was there a decrease.

The sprouting of potatoes has been already described in Leaflet No. 19, but the main points of importance may be again briefly indicated.

The chief advantage of sprouting is that a few weeks' growth is secured in the boxes before the seed is planted. Consequently, if the two kinds of seed are planted about the same time, the crop from the sprouted seed is ready for lifting several weeks before that from the unsprouted seed. Again, if a farmer has seed sprouted and the soil is wet and cold, or the conditions unfavourable, he may delay planting for a time. Further, on freshly tilled land the sprouted potatoes make such an extremely rapid growth as smothers the weeds for the whole season.

Another advantage gained by sprouting seed is that the first bud is preserved, and the plant is therefore more vigorous throughout the season; whereas with unboxed seed the first bud, when it exists, is tender, and usually gets broken off.

#### THE SPROUTING BOX.



The above illustration shows a box which is strongly recommended for general use. The dimensions are:—length, 24 inches; width, 12 inches; depth, 3 inches. The corner pieces are seven inches in height, and so strong that the boxes can rest one on the top of the other when piled for winter storage.

The handle bar is made very strong and tenoned into the end pieces, the whole forming a light, handy, durable utensil which,

with ordinary care, will last for years. The boxes are not expensive, the cost varying from 30s. to 35s. per 100, according to the quality of the timber and the number of boxes bought at one time. Timber merchants are now making these boxes in Dublin, Belfast, Cork, Clonakilty, Wexford, Newry, and other places.

Each box holds about 20 lbs. of potatoes or six boxes hold about one cwt.

If a potato grower is unable to procure a sample box, the Department are prepared to supply him with one free of charge.

### BOXING.

The seed potatoes are filled into the boxes until level with the sides. No earth is mixed with them and no water added; nor need particular care be taken to have the eyes set upwards. The potatoes are simply poured indiscriminately into the boxes, and left to sprout. If large sets are used they will be one deep in the boxes, but smaller ones may be two to three deep. This does not matter, as the sprouts find their way up through the interspaces. When the boxes are filled, they are piled up one on the other to any height that may be found convenient.

There is no way in which seed can be kept more safely or stored in smaller compass. Moreover, it can be examined and overhauled at convenience, should that be found necessary. As in Ireland the trouble will probably be not to get the sprouts sufficiently long, but to keep them from growing too long, the end of December would, with late varieties, be early enough to fill the boxes.

The sprouts should be about two inches long. If much longer they are apt to get broken off unless very tenderly handled. The length of the sprouts, however, cannot always be regulated, and sometimes they may be so long as to touch the box above. There is no actual harm in this, but it is inconvenient and should be prevented if possible. The best way to check growth is to expose the boxes to light and air. When growth is desired exclude all light. Exposure to light and air for some time before planting is necessary in any case, in order to toughen the sprout and enable it to be handled. When the boxes are taken into the light the sprouts are very white and tender, just as they are in a pit, but after a few days' exposure they become quite tough and do not readily break.

At this stage another most valuable use of the box becomes apparent, viz., the facility it gives for checking the purity of the stock. Among the multiplicity of varieties there are scarcely two which have the same colour of stem or habit of growth. Thus *Puritan*

has a white and spindly stem, which becomes greenish on exposure; *Early Regent* has a short, sturdy stem, which becomes bright red; *Maincrop* becomes purple. In this way it is always possible to eliminate the "rogues" before planting, although it is a troublesome operation.

#### SIZE OF SEED.

Irish farmers, as a rule, prefer to cut their seed potatoes. This method has some advantages, the chief being the saving of seed effected. The practice is, however, carried to extremes, for three or four sets are often cut from a small tuber. This certainly saves seed, but it greatly reduces the yield.

Boxing almost precludes cutting. Of course the seed can be cut after exposure has rendered the sprout strong enough to be handled. This, however, is a tedious and expensive process, and is not recommended.

If, however, cutting is desired the seed should be boxed early, and when a tiny shoot has been sent out it should be broken off. The potatoes will then bud from several eyes; but it is not advisable to cut into more than two pieces. Tubers should not be cut until immediately before planting and the cut surfaces should always be dusted over with air-slaked lime.

Potatoes for boxing should be dressed over a  $1\frac{1}{2}$  inch riddle.

The best results may be expected when medium-sized, well-sprouted and uncut seed are planted about 14 inches apart in the drills.

#### STORING BOXED POTATOES.

After the boxes have been filled and housed care must be taken lest the potatoes suffer damage from frost. It takes a good deal of frost to injure potatoes in boxes provided there are no apertures through which cold winds can reach them; but in case of a protracted and very hard frost it may be necessary to cover them carefully or in very severe cases to burn one or more lamps in the boxing house.

House accommodation is not always easily provided. Boxes are frequently piled in the rafters of stables and cowsheds, and they do quite well in such places.

*Copies of this article in leaflet form (No. 58) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.*

## THE MANUFACTURE OF ALCOHOL FROM POTATOES.

The distillation of potato spirit has become a most important industry on the Continent, and more especially in Germany. Some idea of the extent of this trade may be obtained from the official agricultural statistics for Germany, which show that no less than 3,088,000 tons of potatoes were utilised in German distilleries for the manufacture of alcohol in the winter of 1901-2.

Considered from the standpoint of rural economics, there is much to recommend this industry. Amongst other advantages accruing from the use of potatoes in distilleries may be mentioned:—

(1) The cost of transport of potatoes is extremely heavy in proportion to their value when compared with other farm products, such, for instance, as grain. Potato spirit, on the other hand, occupies only a very small proportion of the volume occupied by the potatoes from which it was made, and is also more valuable. Hence the cost of transport of the potatoes when in the form of spirit is considerably reduced. (2) Provided the by-products resulting from the manufacture of alcohol are utilised on the farm the sale of alcohol does not in any way impoverish the soil, for, unlike potatoes, alcohol contains none of the elements which are valued as fertilising ingredients in the soil, but only such elements as may be derived from air and water. (3) The refuse from potato distilleries forms a valuable food for most classes of cattle, and contains all the mineral and nitrogenous constituents removed by the potatoes from the soil.

The general principles of the process consist in hydrolising the starch of potatoes (*i.e.*, changing the starch into sugar) by means of the ferment diastase contained in barley malt, fermenting the resulting mash with yeast, and distilling the alcohol from the fermented mass.

### Method of Manufacture.

The unsorted potatoes, large and small, sound and bad, are first run through a washing apparatus and afterwards conveyed to an automatic weight recorder before being delivered into the steamer. This consists of a conical-shaped iron vessel in which the potatoes are reduced to a pasty consistency under the influence of steam at three atmospheres' pressure. At the same time complete sterilisation is effected, and no evil results due to unsound potatoes are caused in the later stages of fermentation.

**Mashing.** The mash is blown from the steamer by steam pressure through a cooler into the mashing apparatus where green (*i.e.*, undried) malt is added. The contents of the mashing apparatus are thoroughly mixed by mechanical stirrers, and the temperature of the mixture of potatoes and malt is maintained at 49° to 51° R. (*i.e.*, 142° to 147° F.). At this temperature the activity of the diastase of the malt changes the starch of both potatoes and malt to sugar without danger of the disturbing effects of bacterial and other fermentations. The mashing apparatus, as is the case with all other machines, &c., where the temperature of the contents has to be regulated, is provided with coils of piping through which water, hot or cold as may be required, can be passed.

**Action of Malt.** When the action of the diastase is complete, the mixture of potatoes and malt is pumped through a cooler into the fermenting vats, where yeast is added. After three days' fermentation at a regulated temperature the fermented mash is pumped through the column distillation apparatus. In this the alcohol is vapourised by steam and concentrated in the rectification and dephlegmatising (dehydrating) apparatus, which yields a liquid containing usually 90-92 volume per cent. of alcohol. Even 96 volume per cent. alcohol may be thus directly obtained. The refuse or distillery slops runs from the still, is collected in a special receiver, and used by farmers as a food for cattle.

**Fermentation.** The green malt used in the above process is prepared from barley in the usual way. Germination is allowed to proceed much farther than is done with ordinary malt, as the object in the case of potato distilleries is to obtain a malt containing as much diastase as possible—the content of sugar, maltose, being a minor consideration. The barley used for malting is not of such good quality or colour as that sold for brewery purposes.

**Preparation of the Malt.** The barley used for malting is not of such good quality or colour as that sold for brewery purposes.

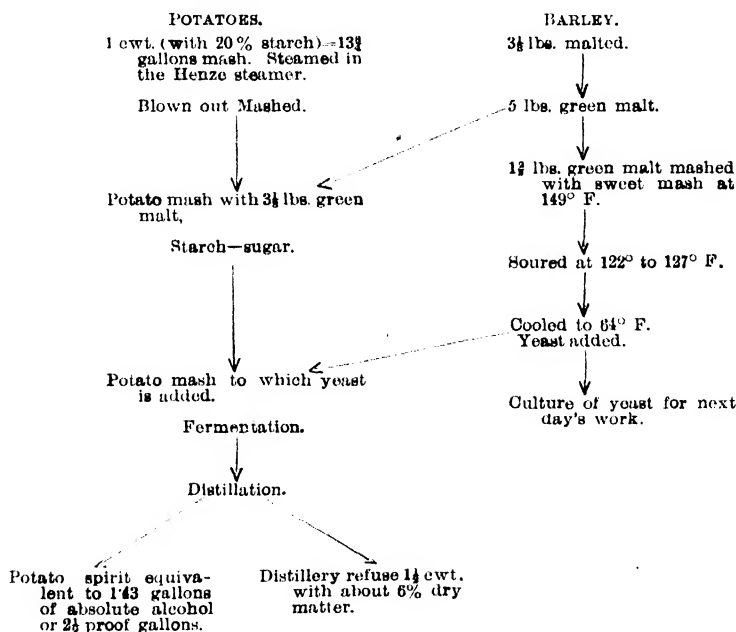
Yeast is added to a portion of the mixture of potato mash and green malt, which is soured naturally by the lactic acid ferment, or artificially by the addition of sulphuric acid, for yeast grows best in a slightly sour medium. This

### The Yeast.

portion serves as a yeast culture ("starter") for the fermentation of the main portion of the mash. Some of the yeast is retained, however, as a "culture" to start similar operations on the following day.

Work in the distilleries begins in September as soon as the potato crop is harvested, and continues until May of the following year. The season, or, as it is known, the "Campagne," lasts, therefore, for nine months of the year.

The preparation of alcohol from potatoes is diagrammatically shown by Professor Buecheler as follows:—



The alcohol produced from potatoes is used for a variety of purposes. In the trade it is used for the preparation of vinegar, in the manufacture of varnishes, lacquers and enamels, and to a very large extent as a reagent in chemical works, especially in aniline factories, and

### Utilisation of Alcohol distilled from Potatoes.

the allied industries.

It is employed further in the manufacture of

perfumes, flavours, essences, some varieties of antiseptic soaps, and for the production of wood silk. Its use for motors—stationary engines and automobiles—is being rapidly extended.

The methylating of spirits is dealt with below. It may, however, be mentioned here that in Germany a portion of the excise duty is remitted on spirit which is used for motive purposes, and that for the methylation of such spirit a mixture of two volumes of benzol, 1 volume of wood spirit, and  $\frac{1}{4}$  volume of pyridin base per 100 volumes of spirit is used. This mixture does not seriously impair the explosive properties of the alcohol. The German Government has taken great interest in the furtherance of the use of potato spirit for motive purposes, and the German War Office exhibited in Vienna a motor car for officers' use, and also an engine for the traction of guns and stores, both of which used potato spirit as motive power. When compared with petrol or other petroleum spirits for the use of motor cars, alcohol possesses the following advantages:—(1) The exhaust is practically free from smell; and (2) less water is required for cooling purposes. A slightly larger volume of 90 per cent. alcohol than of petrol is required for an engine, but this disadvantage is counterbalanced by the greater efficiency of alcohol as compared with petrol.

Effective road motors are now made in which alcohol is vapourised to form with air the explosive mixture in the cylinder. Up to the present a proportion of 50 per cent. alcohol in the spirit used has apparently given the best returns.

The use of alcohol for motors in Germany is rapidly increasing. In January, 1903, there were only 771 alcohol engines in the Empire, but in April, 1904, the number had increased to 1,370.

Amongst the domestic purposes to which alcohol is applied may be mentioned lighting (incandescent, with mantles), and as fuel for the heating of ovens, stoves, linen irons and the like.

When re-distilled and further purified the alcohol obtained from potatoes is used as potable spirits and sold under various names.

The distillery slops are much prized as a food for milch cows and fattening cattle. Their composition,

**The refuse or distillery slops.** and hence their value as food, varies with the following conditions:—Composition of potatoes used, degree of fermentation, concentration of the mash, the amount of malt added to the mash, and the class of distilling apparatus used. It is difficult, therefore,

to estimate their average composition, but Kuehn gives the following figures as mean :—

Dry matter = 5·8 %

Therein :—Proteids	..	..	..	1·3 %
Fat	..	..	..	0·1 %
Carbohydrates	..	..	..	2·9 %
Fibre	..	..	..	0·8 %
Ash	..	..	..	0·7 %

The slops are sometimes desiccated. The drying is a very costly process, but the desiccated slops are more easily preserved and transported. Kuehn quotes the following average composition of the dry product :—

Dry matter = 88 %

Therein :—Proteids	..	..	..	24·0 %
Fat	..	..	..	3·2 %
Carbohydrates	..	..	..	39·8 %
Fibre	..	..	..	9·2 %
Ash	..	..	..	11·8 %

It will be noticed that the relative proportion of the various ingredients in these two foods varies. The analyses, therefore, show the returns from different samples of distillery by-products.

The feeding values of the untreated products and of the desiccated refuse have been estimated by Maercker at 3½*d.* per cwt., *i.e.*, 5*s.* 10*d.* per ton, and 4*s.* 7*d.* per cwt., *i.e.*, say, £4 12*s.* per ton respectively.

As much as 1 cwt. per head per day of the untreated refuse is often fed to cattle. As the slops offer a most suitable medium for the growth of many putrefactive and harmful bacteria, great care is necessary in the use of this food. It must be fed when fresh and hot, and care must be taken that the feeding troughs are properly cleaned and kept quite sweet.

In Germany great care and attention have been given to the propagation of potatoes suitable to a variety

<p><b>Variety of</b> <b>Potatoes used.</b></p>	<p>of purposes. Some varieties are grown only for cooking purposes, others for use as salad, and still others, which have been specially chosen for their high content of starch, are grown for industrial purposes, including starch, dextrine, and alcohol manufacture. The last class of tubers is not at all suitable for use as a table vegetable. At the exhibition in Vienna several varieties containing more than 22 per cent. of starch were on view, whilst at a co-operative distillery in Bavaria the average starch content of the potatoes used in the season 1902-3 was 17·3 per cent., and ranged from 15 to 20</p>
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per cent. The composition of potatoes varies largely with variety, season and locality. In general, the potatoes grown in Prussia for the Magdeburg factories are richer in starch than those of Bavaria.

In 1903 the most usual varieties grown in Bavaria for the alcohol distilleries were "Professor Wohltman" and "Aspasia," but, as is the case in the British Isles, the varieties are changed every few years.

The action of the diastase of malt on potato starch is to render it into maltose, which is readily fermented by yeast, and dextrine, which is not so easily fermentable. When selecting varieties of potatoes for use in distilleries not only has a high content of starch to be kept in mind, but varieties must be chosen whose starch, when acted on by diastase of malt yields a high proportion of maltose and a low proportion of dextrine. In the older varieties this relation was as 4 to 1, but the newer varieties are so improved as to show a relation of eight parts of maltose to one of dextrine after the action of the diastase.

The yield of potatoes varies, of course, but in Bavaria a crop equivalent to 7 tons per statute acre appears to be regarded as an average yield.

Malt is usually prepared in the distillery. The barley used, as before explained, is not so good in quality as  
**Barley used** brewer's barley, being lighter in weight per  
**for Malting.** bushel and darker in colour. Second-class  
 brewer's barley is used by some distilleries,  
 whilst at others four-rowed barley grown especially for distillery  
 purposes is employed.

As the system of excise in Germany differs materially from that of the United Kingdom, the prices paid for distillery materials in the former country cannot be made directly applicable to the latter. As was the case in Ireland, prices higher than usual prevailed in the winter 1903-4, and 26*s.* to 27*s.* per ton may be regarded as the average price paid last season in Bavaria. Prussian agricultural economists usually calculate the equivalent of 20*s.* per ton as the value of potatoes for industrial purposes. In Berlin the prices of such potatoes ranged from 12*s.* 9*d.* to 27*s.* 6*d.* per ton in 1901, from 11*s.* 8*d.* to 20*s.* in 1902, and from 15*s.* to 30*s.* in 1903.

The price paid for barley is as high as 26*s.* per quarter, *i.e.*, 13*s.* per barrel of 16 stoness.

Regarding the substances which may be added to spirits for their methylation, the following regulations are in

**The Preparation of** force for the United Kingdom:—

**Methylated Spirits.** “Methylated spirits for use in the arts and manufactures (ordinary methylated spirits)

“must, according to law, consist of a mixture of plain British spirits, or unsweetened foreign spirits, or rum with one-ninth of their bulk of wood naphtha or methylic alcohol, or with such other substance or combination of substances approved for the purpose by the Commissioners. Methylated spirits intended for sale by retailers (mineralised methylated spirits) must contain in addition three-eighths of one per cent. of mineral naphtha or petroleum oil.”

A distinction in the methylation of spirits for retail and for industrial purposes is also made in Germany. For the former purposes, and for every 100 litres of spirits, there are used  $2\frac{1}{2}$  litres of a mixture of four volumes of wood spirit and one volume of a pyridin base, to which as much as 50 grams of lavender or rosemary oil per litre may be added. For industrial purposes about twenty methods of methylation are prescribed. The method employed varies, of course, with the use for which the spirit is ultimately intended. The rapid development of the chemical industry in Germany is undoubtedly partly due to the cheap and suitable methylated spirit which can be produced under the favourable excise and methylating regulations enforced by the German Government. For the preparation of varnishes, lacquers, photographic papers and plates, aniline colours and certain anæsthetics and disinfectants, a supply of cheap, but at the same time suitably methylated, alcohol is a necessity. For all these industries potato spirit is just as suitable as the spirit obtained from the distillation of cereals.

As has already been stated, the manufacture of alcohol from potatoes is an extensive and well-established business on the Continent. There arises the question—“Is this an industry which would be profitable in Ireland”? With a view to settling this question the following estimates,

**Suitability of  
this Industry for  
Ireland.**

which apply to a distillery capable of dealing each season with 2,250 to 2,500 tons of potatoes have been prepared. Such a distillery would require to be fitted with machinery and utensils for three daily mashes, each of 660 gallons, and would work eight or nine hours each day for 250 days, say, from the middle of September to the end

**Estimates for the  
working of a Potato  
Distillery.**

of June each year. It is estimated that the yearly expenditure would be as follows :—

				£
(1.) Interest and depreciation on (a) buildings costing, ..				2,250
and (b) machinery and apparatus costing ..				2,250
				<hr/> £4,500
Interest at 5 % on total outlay ..	..	..	£225	
Depreciation 5 % on machinery ..	..	..	113	
Depreciation 2½ % on buildings ..	..	..	56	
				<hr/> £394
(2.) Cost of working :—				
Wages of distiller for ten months ..	..	..	£80	
Wages of four workmen at 12s. each per week for				
ten months .. .. .	..	..	100	
Insurance .. .. .	..	..	55	
Up-keep of machinery .. .. .	..	..	20	
Coals—18 cwt. daily at 18s. per ton ..	..	..	203	
				<hr/> £458
(3.) Cost of raw materials :—				
2,400 tons of potatoes not here reckoned ..				
Barley, 9 bushels per day, at 25s. per quarter ..			£352	£352
				<hr/>
Total expenditure, including interest, but ex-				
cluding cost of potatoes .. .. .	..	..	..	£1,204

To meet this estimated expenditure, plus the cost of the potatoes, it is estimated that there would be available the following sums :—

(1.) Alcohol produced :—			
94,800 proof gallons at 10d. per gallon ..	..	..	£3,950
(2.) Value of the distillery refuse :—			
3,000 tons at 5s. per ton .. .. .	..	..	750
Total receipts .. .. .	..	..	£4,700
Less expenditure as above .. .. .	..	..	1,204
Leaving as payment for 2,400 tons of potatoes, or,			£3,496
approximately, 29s. per ton.			

Although, as previously stated, the unsorted potatoes, just as they are raised in the field, may be used for distilleries, it is not possible, in view of the above figures, to manufacture alcohol profitably from potatoes in Ireland since higher prices than 29s. per ton are always realised by farmers for potatoes for other purposes.

Of course German distillers do not, as a rule, work at a loss, and it may be asked why the distillation of potato spirit pays in Germany whilst remunerative prices cannot be paid in Ireland. This difference is probably due to four causes, viz. :—(1) The favourable system of taxation adopted by the German Government in the case

of the so-called "agricultural distilleries"\* (*landwirtschaftlichen Brennereien*), which enables them to compete with distilleries in which cereals alone are used. (2) The payment of a bounty by the German Government on alcohol used for methylation, export, or in the manufacture of goods intended for export. (3) The cost of transport of potatoes from some parts of the empire to a large consuming centre, and the consequent low net price realised for potatoes intended for general consumption; and (4) the use of a large proportion of potato spirit, when refined and purified, as potable spirit.

In order to trace the effects of the two first-mentioned causes, and in view of the attention now being paid to

### German System of Taxation of Potato Spirit.

(1) the production of cheap alcohol for industrial purposes, and (2) the general system of duties imposed in the United Kingdom, the following notes on the German system of taxation of potato alcohol have been compiled.

The regulations regarding the duties to be paid by distillers of

### Objects of the German System.

potatoes in Germany were drawn up in such a manner as to lead to (1) dearer potable spirits, and thus the less extended use of spirits for drinking purposes; (2) cheaper alcohol for industrial purposes, and its more extended use for heating, lighting, export and general industrial purposes; (3) advantages to agricultural distilleries (see footnote below) as compared with industrial distilleries; (4) advantages to small as compared with large distilleries; and (5) efficient management of distilleries. The duties levied may be considered under three heads—(a.) *Verbrauchsabgabe*, (b.) fermenting vat and distillery material tax, and (c.) *Brennsteuer*.

The *verbrauchsabgabe* is levied on two scales, viz., 0.50 M. and 0.70 M. per litre absolute alcohol (i.e., from

**Verbrauchsabgabe.** 1s. 3½d. to 1s. 10d. per proof gallon). Every five years the Government decides the quantity of alcohol which each distillery is entitled to have taxed at the lower rate, and in fixing this quantity, styled the "Kontingent,"

\* Distilleries complying with the following conditions are classed as Agricultural:—(1) raw materials used to be potatoes and corn only; (2) most of the potatoes and corn used to be grown by the distillery owner or co-operative owners, except in seasons following bad harvest; (3) by products to be used on the owner's farm, and (4) the manure resulting from the consumption of such by-products to be used on land belonging to the distillery owner. Distilleries in which principally non-mealy substances (i.e., non-cereal or not potatoes) such, for instance, as fruit, fruit refuse, wine, brewery by-products, are classed as "material distilleries." All other distilleries, for instance, those using maize, rice, or other cereals, also molasses, beetroot and beetroot syrup, are regarded as "industrial."

consideration is given to conditions prevailing in the neighbourhood of the distillery. For instance, where it appears desirable to encourage the cultivation of potatoes and the production of a large amount of food for cattle in the form of distillery by-products, and consequently an increase in the number of cattle which may be kept, a high "Kontingent" is allocated, whilst in districts well supplied with distilleries a correspondingly lower allocation is made. The output in excess of the quantity allocated is taxed at the higher rate, but all alcohol destined for export, technical, hospital and scientific purposes, is exempt from any charge whatsoever under this head.

The fermenting vat tax is levied only in agricultural distilleries (see footnote, p. 317). It amounts to 1·31 M.

<b>Fermenting Vat and Distillery Material Tax.</b>	per hectolitre ( <i>i.e.</i> , 1s. 4d. per 22 gallons) of fermenting vat capacity for each fermentation. It is arranged, however, on a scale advantageous to the smaller distilleries.
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Those mashing not more than 1,050 litres (*i.e.*, 231 gallons) per day are required to pay six-tenths, those mashing not more than 1,500 litres (*i.e.*, 330 gallons) eight-tenths, and those mashing not more than 3,000 litres (*i.e.*, 660 gallons) nine-tenths of the above-mentioned rate. The distillery material tax applies only to material distilleries (see footnote on p. 317), and varies from 0·25 M. to 0·85 M. per hectolitre of raw material (*i.e.*, from 3d. to 10d. per 22 gallons) according to the raw substances employed. The smaller distilleries are given preference also in regard to this duty in accordance with the following scale:—

For a yearly production not exceeding 50 litres absolute alcohol ( <i>i.e.</i> , about 19 proof gallons).	} Four-tenths of above rate.
Yearly production not exceeding one hectolitre ( <i>i.e.</i> , about 38 proof gallons).	
	} Eight-tenths of above rate.

Neither the fermenting vat tax nor the material tax is charged where the alcohol produced is exported or used for technical, hospital, scientific or household (heating, cooking and lighting) purposes.

The alcohol produced in industrial distilleries is taxed at a higher rate than that produced in agricultural or material distilleries. It is not subject to the fermenting vat tax nor the material tax, but the *Verbrauchsabgabe* is charged on a higher scale.

In addition to the *Verbrauchsabgabe*, in case a distillery produces

<b>Brennsteuer or Distilling Tax.</b>	more than 200 hectolitres of absolute alcohol yearly ( <i>i.e.</i> , about 7,652 proof gallons), a tax on the output in excess of this quantity is levied; the smaller distilleries
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again having the advantage over larger ones. The scale of this tax *Brennsteuer*, is as follows :—

From 200 to 300 hectolitres ( <i>i.e.</i> , 7,652 to 11,478 proof gallons).	} 2 M. per hectolitre absolute alcohol ( <i>i.e.</i> , 2s. per 38 proof gallons).
From 300 to 400 hectolitres ( <i>i.e.</i> , 11,478 to 15,304 proof gallons).	} 2.50 M. per hectolitre absolute alcohol ( <i>i.e.</i> , 2s. 6d. per 38 proof gallons).
From 400 to 600 hectolitres ( <i>i.e.</i> , 15,304 to 22,956 proof gallons).	} 3 M. per hectolitre absolute alcohol ( <i>i.e.</i> , 3s. per 38 proof gallons).
From 600 to 800 hectolitres ( <i>i.e.</i> , 22,956 to 30,608 proof gallons).	} 3.50 M. per hectolitre absolute alcohol ( <i>i.e.</i> , 3s. 6d. per 38 proof gallons).

And so on, increasing by 0.50 M. per hectolitre (*i.e.*, 6d. per 38 proof gallons) for every 200 hectolitres up to 1,800 hectolitres.

The receipts from this tax are devoted to the payment of a bounty at the rate of 6 M. (6s.) for each hectolitre of absolute alcohol (*i.e.*, every 38 proof gallons) exported, methylated, or used in the manufacture of exported goods.

The advantages to “agricultural” as compared with “industrial” distilleries, and the fostering of small

**Results of this  
Taxation.**

distilleries at the expense of larger ones will now be readily understood. That the system of taxation as detailed above has already, to some extent, achieved the other objects for which it was devised, is apparent from the following statistics :—

(1.) The consumption of potable spirits in Germany has *decreased* from an average of 4.4 litres per head in 1893-4 to 4.0 litres in 1902-3.

(2.) The use of alcohol for technical purposes has *increased* from 1.3 litres per head in 1893-4 to 2.2 litres in 1902-3.

(3.) The yield of alcohol per unit of starch used, obtained by distilleries is increasing. In other words, the working of the distilleries is now more efficient than was formerly the case. The improvement is due partly to the establishment of distillery schools and experiment stations (such as the School of Fermentation Industries in Berlin, and the distilling and brewing departments of the Agricultural Academy at Weihenstephan, in Bavaria). It is also, however, claimed that the imposition of the fermenting vat tax has contributed to this greater efficiency of working, as the distiller will endeavour, in his own interests, to obtain the maximum possible yield of alcohol from the mash employed.

J.H.H.

## MOULDS ON BUTTER.

The growth of moulds on the surface of marketed butter or on the grease-proof paper used in lining butter packages for market, is apparently giving much trouble and causing no little loss to creamery managers.

The question arises, how can such growths be prevented? In order to present the matter intelligently it will be necessary first, to say something about the moulds themselves, and secondly, to explain the most important factors that regulate their appearance and increase.

The particular kinds of mould we are at present considering form delicate mats of exceedingly fine and much-

**Biology of Moulds.** branched thread-like tubes that creep—often with astounding rapidity—over the surface of things upon which they feed. It is of the nature of a mould to select its own particular kind of food, and one comes in time to associate certain kinds of moulds with particular kinds of substances liable to become mouldy.

To enable a mould to grow well, not only must the food-yielding substance be moist, but the air must be moist, too. If the air be dry then the delicate threads of the mould get dried up, the living tubes collapse, and either growth is checked or life destroyed.

As to temperature, a large number of moulds can grow at comparatively low degrees of heat—a point to be kept in mind in connection with the matter under present discussion.

Like all fungi, moulds do not require light; indeed, they seem to thrive best in darkness.

Their relations to air are such that any space giving a sufficiency of room for growth seems to supply enough air to keep them in health.

It follows, therefore, that given a suitable food medium, a low temperature, close damp air and darkness, moulds will find just the particular set of conditions that will suit their special requirements of growth.

But a fresh crop of any particular kind of mould can only arise from the germination of spores produced by a previous generation of that species. Spores are formed by most moulds on the tops of

special branches that rise erect from the creeping feeding tubes, so that, as the hollow prostrate threads extend themselves, fresh fruiting branches arise until patches of mould with powdery surfaces occupy relatively wide areas of surface.

One of the commonest of moulds is the "green mould," so called because the spore surface rapidly takes on a dark green tint. It is known to science by the name of *Penicillium*, and is the mould that most commonly occurs on butter packages. It may be found on all sorts of "mouldy" substances, and a little examination will show how very prolific this mould is. A touch of the finger tip will remove many dozens of spores, while a puff of wind will send into the air perhaps thousands. They are so light that even slight draughts will distribute them hither and thither as floating motes in the buoyant air. And, of course, each of these spores has the power of producing a new mould growth if it chances to settle on a suitable food and finds itself surrounded by the other conditions that favour fungal growth and development.

In considering the means of preventing the unsightly growth of *Penicillium* in butter packages it is obvious

**Prevention of Mould-growth.** from what has been said concerning moulds and their growth, that in order to prevent the appearance of such growths we must

either keep the spores from settling down on the butter or butter-paper, or else render the conditions of life unfit for their development. It is impossible—and even if possible extremely undesirable—to alter or even modify two of the necessary requirements of mould life, namely, darkness and low temperature. Two others, however, stagnant air and moisture, may be, to a limited extent, helpfully modified. The use of well-seasoned wood, instead of new sappy wood for the making of kegs, &c.; the careful storage of butter papers in clean, dry places; and the keeping of the made-up packages in dry, well-ventilated store rooms, will at least go some way towards inducing unfavourable surroundings for mould growth. The two remaining factors are the presence of spores and the existence of a suitable food.

First, as to the presence of spores in the closed packages. It seems certain that in the majority of cases, at all events, the spore contamination takes place during the time taken to fill the boxes with butter, cover with paper, and fasten down the lid. Of course, if badly-joined packing cases are used subsequent contamination is possible, but assuming the packages to be dust-proof then the risk



of contamination will depend entirely upon the general cleanliness in vogue at the creamery. If any decomposable substances upon which moulds can grow—such as scraps of bread, injured fruit, cooked or broken vegetables, stale milk or even stale smears of milk, exist either within or in the immediate vicinity of the creamery, they constitute a perpetual menace to clean packing, as they afford an excellent feeding and propagating ground for moulds, and contribute a never-failing supply of spores to the floating motes in the air of the creamery. Then, again, the unbrushed clothes—that is the ordinary clothes—and, unhappily, in some cases, the insufficiently washed hands and arms of the packer, are fruitful sources of contamination.

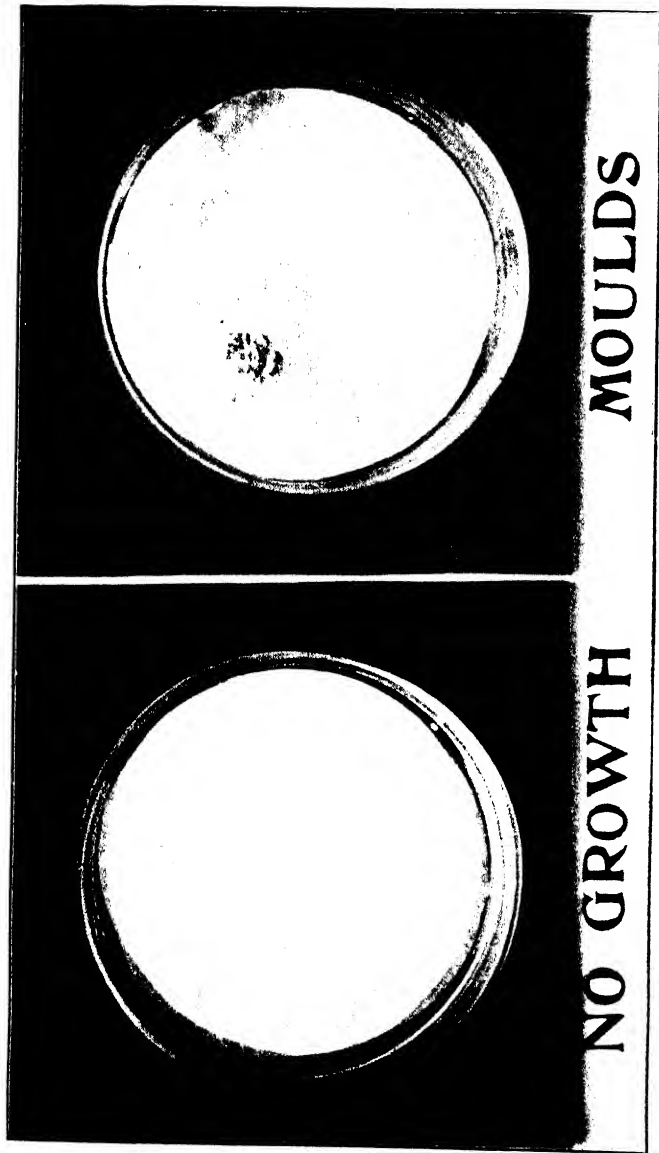
Packing should be done in a clean room free from draughts, and by workers suitably clad in spotless clothes or overalls. The spores of moulds are so very minute that really very large numbers may be present and yet be unseen, and it is this very character that secures for them the luxuriant means of existence enjoyed in places where strict cleanliness is the last, instead of the first duty. By following the clue suggested by a knowledge of the natural history of a mould and making every effort to keep down the supply of spores by removing the spore-producer's feeding and breeding ground, and following this up by adopting stringent precautionary measures against the packer bringing in, on clothes or hands, spores from the outside, a great deal could be done towards lessening the risk of having mouldy butters placed upon the markets.

In order to get definite information as to the last factor, namely, the value of butter, or butter<sup>a</sup> paper, as a source of food for the particular kind of mould causing the trouble, a number of papers covered with mould growths were taken from packages sent into one of the surprise butter competitions. On examination the mould proved to be *Penicillium*. Cultures from these papers were made to supply spores for use in the investigation.

**An Examination  
into the causes of  
Mould-growths.**

In order to ascertain how far butter and butter papers would favour the growth of *Penicillium* a set of test experiments were conducted. Samples of butter paper ranging in quality from the cheapest to dearest were obtained from a wholesale firm of repute in Dublin. Convenient sizes from these were soaked in sterile water containing the salt (phosphates, &c.), but none of the organic compounds (sugar, fat, &c.) of milk. One from each sample was exposed to dusty air of

## MOULDS ON BUTTER.



Cultural Experiments with *Penicillium* mould on butter paper. The photograph shows two sterilised culture dishes, each containing discs of new butter paper. The paper in the left hand dish was steeped in sterile water containing the ordinary salts of milk and then artificially "seeded" with *Penicillium* spores. Moulds refused to grow on the paper. The paper in the other dish was treated in the same way but "soiled" with skim milk in places. Soon after "seeding" a crop of mould appeared wherever the paper was contaminated with milk stains.



a room, and duplicates were deliberately "seeded" with *Penicillium* spores. The cultures were kept for twenty-eight days under conditions favourable to mould development. *No growth was made in a single case.* From this result it was clear that, owing to its peculiar mode of manufacture the butter paper, even though kept damp, was unable to supply the necessary organic food required by the *Penicillium*, and so there was no growth. But why does the *Penicillium* sometimes grow on the butter paper in kegs and other packages? The next series of experiments had for their object the answering of this question.

The hands (not apparently "dirty," but still unwashed) were dipped in milk and then shaken. Butter papers, similarly prepared as before, were handled by the milk-damp hands. The papers were inoculated also, as before, with *Penicillium* spores, and then placed in the culture chamber. Parallel experiments were made with unwashed milk-damp hands and exposed for a few minutes to air into which *Penicillium* spores were blown. *Clumps of Penicillium grew on the contaminated parts of the paper in every case in both series.*

The growths were evident on the fourth day. In some cases *Penicillium* grew on the contaminated spots in the first series not directly inoculated with spores. The spores originating the growths in all probability came from the unwashed hands.

The next series of experiments was with butter, in order to ascertain how far this substance can support the growth of the *Penicillium* mould. Well-made "dry" butter was selected, and used as an experimental medium for *Penicillium* growth. At the end of twenty-one days after "seeding" there was *no appearance of a single point of growth.* This proved that clean, pure, well-worked butter would not grow *Penicillium*, even when deliberately "seeded" with the spores of this mould.

Experiments similar to those with the papers, and with the same object, were tried with butter, and *with exactly the same results.* Butters with surface contaminations supported mould growths, and badly washed butters, giving a surface film of buttermilk, also supported *Penicillium* growths, tiny specks appearing on the third day.

It seems almost needless to emphasise the bearing of these results upon the question of prevention of mould growths in butter packages. It is sufficiently clear that the freer the butter is of buttermilk on its surface the safer it is from fungal attack. Further, that

every care should be taken not to handle the butter paper with either unwashed or milk-damp hands, but so to conduct the packing as to make the conditions of the *Penicillium's* food supply as scanty and inadequate as cleanliness, intelligence and care can devise.

And finally, if milk or cream is allowed to adhere to the walls, or, what is too commonly the case, behind cream and milk vats, moulds cannot be avoided, as all stale cream and milk form a soil very favourable to the production of mould spores, which are wafted by the air out of every hidden uncleaned corner to settle on butter papers and boxes, there to produce a fresh crop to the disgust of the butter merchant and the distrust of Irish butter trade.

#### RULES FOR THE PREVENTION OF MOULD GROWTH.

The suggestions arising from the above account as to the means whereby the growth of moulds on butter packages may be prevented may be summarised as follows:—

1. Use dust-proof packages made of suitable well-seasoned wood.
2. Keep the stock of butter papers dry, but free from dust and other contaminations.
3. Let the packing be done under the cleanest conditions, taking special precautions against dusty air and contaminations from the hands and clothes of the packer.
4. See that the butter is properly "worked," and that the butter-milk is well washed out.
5. Do not touch the surface of the butter or handle the butter paper with either unwashed or milk-damp hands. Keep a clean, dry towel handy to wipe the hands dry when operating the butter papers; also see that the lid of the package is not wetted with milk on its inner surface.
6. Store packages in a clean, dry, airy store-room.
7. Keep the creamery clean, and avoid having hidden unclean corners between vats and the wall, as it is there the spores are cultivated.

## FLAX SEED, 1905.

### DUTCH FLAX CROP.

The flax crop of 1904 is reported to be the best that has been grown in Holland within the last ten years, and it is understood that, compared with the previous year, there has been an increase in the acreage under flax. Home-saved (Riga Grandchild) and imported (Riga) seeds have done equally well; but, as was anticipated, the few trials made with Riga Child (*i.e.*, the produce of the Russian crop of 1902), have given poor results.

Very favourable weather prevailed during the harvesting of the crop, and the seed has, therefore, been obtained in prime condition. It is estimated that about one-third more will be available for sowing purposes than was the case last year. The grain ("pickle") of the new seed is not very large but is round, full, and strong, and of a good colour. A few tests have shown it to possess a germinating power above the average.

The Department recommended Dutch Riga Grandchild for the 1904 sowing. The seed, which will be sold under this name for sowing in 1905 should, however, be avoided by Irish farmers, as it is the produce of last season's inferior Riga Child. *Irish growers who sow Dutch seed in 1905 should use Riga Child (known also as "Revelaur") which is the first crop obtained in Holland from imported Riga seed.* The Department are informed that Dutch farmers did not sow Riga seed so largely in 1904 as in some previous years, and hence the supply of Riga Child seed will be more limited than other varieties of Dutch flax seed. Growers would, therefore, be well advised to place the orders for their requirements early, and to buy only through reliable houses, as a statement regarding the origin of seed is a matter depending solely on the honour of the merchant and shipper through whom the seed is procured.

### RUSSIAN FLAX CROP.

Owing to the cold and wet spring flax was sown in Russia much later than usual. Seed, however, was good and plentiful, and there was an increase of more than 20 per cent. in the acreage put under flax. The cold and wet weather continued to the middle of July, up to which time the flax made little progress. These climatic conditions had a somewhat beneficial effect on the crop, as they kept it more free from weeds than is usually the case. From the middle of July onwards the crop grew under more favourable conditions than those previously prevailing, but the harvest was fully three weeks

later than usual. Reports received from various Russian districts indicate that many farmers pulled their crop before it was fully mature, and the seed was either sacrificed or secured in poor condition--and will, consequently, only be fit for crushing purposes. The seed of the later and also of the more mature crop was, moreover, somewhat damaged by frost.

The Pernau district would appear to have been favoured with better weather conditions for harvest work, and the saving of flax seed, than some other localities; and, although night frosts were common, a good proportion of the seed of the flax crop has been fairly well saved, and will be available for sowing purposes.

All Russian seed will be purer than has been the case for some seasons past. But few samples of Russian seed have yet been shown on the market, and it is anticipated that first class sowing seed will be scarce, and command a good price. *Seed from the Pernau district is always carefully selected, and is to be recommended for use in 1905 by Irish growers whose land is suited to Riga seed.* Great care, however, will have to be exercised this season in the selection of the Riga seed. The germinating power of samples of Russian seed already tested is much below the average, and hence the Department would strongly urge farmers to demand a guarantee of purity and germination of the seed they intend to purchase.

The Department cannot too strongly impress on growers that the practice which has hitherto prevailed of sowing inferior and, therefore, cheap seed, is inimical to their best interests. They well know the difference between the crop grown from good and that grown from bad seed, and that the small extra outlay involved in the purchase of high class seed is returned many times over in the superior quality of the resulting crop. Further, the use of inferior seed may mean the total loss of the crop in many instances; and as the Department have in operation a Seed Testing Station, at which farmers can have the germinating power of the seed tested at a nominal charge of 3*d.* per sample, growers are afforded exceptional privileges of satisfying themselves of the superiority or otherwise of the seed which they propose to sow for next year's crop.

Special envelopes in which to forward samples of seed for testing may be procured free of charge on application to the Department.

*Copies of this article in leaflet form (No. 29, Revised) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.*

OFFICIAL DOCUMENTS.



## OFFICIAL DOCUMENTS--AGRICULTURE.

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## AVONDALE POULTRY FATTENING STATION.

The Department have established a Station at Avondale, Rathdrum, County Wicklow, for the purpose of training a limited number of young men desirous of acquiring a practical knowledge of the breeding and fattening of poultry with a view to undertaking the management of Fattening Stations in other parts of the country.

Apprenticeship may extend over six months, or a year, in accordance with the industry and efficiency displayed by the individual. All the apprentices will be required to work daily from 7 a.m. to 6 p.m. in summer, and from daylight to dark in winter, with one hour for dinner. An experienced Superintendent will direct the work and give instruction in the proper methods of rearing and fattening. A certain amount of theoretical instruction will be provided in the evening. Apprentices will be paid wages at a rate not exceeding 16s. per week.

The engagement between the Department and apprentices may be determined at any time by one week's notice. No applicant for apprenticeship will be accepted who is not strong, healthy, and over twenty years of age. Preference will be given to those who have already had some experience in poultry keeping. They must be prepared to undergo an entrance examination in English and Arithmetic, which will be held in Dublin on the 29th December, 1904. No expenses will be allowed to candidates in connection with attendance at this examination.

Apprentices will be required to find their own board and lodging, but the Superintendent will assist them by supplying the names of persons who have suitable accommodation in the neighbourhood of the Station.

Application should be made on a form, to be obtained from the Department, and should be returned so as to reach the offices of the Department not later than the 27th December, 1904.

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## INSTRUCTION IN FRUIT GROWING AND GENERAL GARDENING.

The Department have at present a few vacancies in their Horticultural School at the Albert Agricultural College, Glasnevin. Applicants must be prepared to undergo an examination to be held at the Albert Agricultural College on a date to be subsequently notified. No allowance will be made to candidates in respect of attendance at this examination.

The examination will include English, Arithmetic, and Practical Fruit Growing and Gardening. The examination in English will include Dictation, Grammar, and Composition, and that in Arithmetic a knowledge of weights and measures, decimal and vulgar fractions, simple and compound proportion, percentages and interest. The examination in Practical Fruit Growing and Gardening will cover the whole range of these subjects.

The course is suited for those who have already had some experience in fruit growing, and, for such, a training of from one to two years should suffice to qualify for the post of instructor in Horticulture. The Department do not guarantee employment to the students at the close of the course, but they will send the names of those who qualify to County Committees of Agriculture and Technical Instruction, with an intimation that the Department will approve of their appointment if selected by a County Committee.

A number of men who have already passed through the school are now employed by County Committees at a salary of £2 per week, together with expenses of locomotion, while a number of counties have this year failed to obtain a qualified Instructor.

While in training the students will require to find lodging in the village of Glasnevin, and will be subject to the conditions under which the gardeners at the College are employed. The wages will be from 18s. to 25s. per week, according to qualifications.

In addition to work in the gardens, the students will be given facilities for studying the application of scientific principles underlying Horticulture.

Forms of application to attend the examination may be had upon application to

THE SECRETARY,  
Department of Agriculture and Technical  
Instruction for Ireland,  
Upper Merrion-street, Dublin.

## OFFICIAL DOCUMENTS—TECHNICAL INSTRUCTION.

DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET,  
DUBLIN, *November, 1904.*

*Circular 32.*

### LOCAL EXAMINATIONS, 1905.

SIR, OR MADAM,

I have to inform you that the Local Examinations in subjects of Science and Art, conducted by this Department on behalf of the Board of Education (South Kensington), will begin on Saturday, 29th April, 1905. Your attention is directed to the Regulations for the conduct of these examinations in Ireland, contained in the Appendix to this Circular, which supersede those contained in Part II. of the Regulations of the Board of Education for 1904-5.

I have to direct your special attention to Paragraph 5 of the Regulations contained in the Appendix, and to state that, while candidates will be admitted to the examinations in Stage 1 of Science and Art subjects on the conditions therein stated, presentation at these examinations will not be a condition of the award of grant in that stage, nor will the results of examination affect the rate of grant to be allowed.

The Department will hold special examinations for Teachers' qualifications in Experimental Science on Saturday, the 13th May, 1905. Full information respecting these examinations has been published in a separate Circular Letter (No. 31). Application for admission to this examination must be made upon Form S 118, which will not be accepted after the 28th February.

Candidates for the Irish Secondary Teachers' Drawing Certificate who desire to present themselves for the special examinations in Elementary Modelling to be held in April, May and June, 1905, must apply for admission to these examinations upon Form S 119. This form will not be received after the 28th February.

Should a sufficient number of applications be received, arrangements will be made to hold examinations in Dublin, Belfast, Cork, Londonderry, Limerick, Waterford and Galway, and, in very exceptional circumstances, when application has been made by School Managers before the 28th February, arrangements may be made for examinations at other centres.

First Class successes at the examinations in Drawing on the Blackboard, which will be conducted by Inspectors of the Department on behalf of the Board of Education (South Kensington) during the months of April, May, and June, 1905, will be accepted towards the Irish Secondary Teachers' Drawing Certificate.

I am,

Sir or Madam,

Your obedient Servant,

T. P. GILL,

*Secretary.*

## APPENDIX.

### REGULATIONS FOR THE CONDUCT OF THE LOCAL EXAMINATIONS IN SUBJECTS OF SCIENCE AND ART CONDUCTED BY THE DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND ON BEHALF OF THE BOARD OF EDUCATION (SOUTH KENSINGTON).

1. The examinations are held in the evenings in April, May and June, and in the daytime in June: the dates on which the examinations in the various subjects will be held are specified in the Examination Time Table, published separately.

Candidates may not present themselves for examination in the same subject at the evening examinations and at the day examinations in the same year.

Candidates may not present themselves for examination in more than one stage of any subject in the same year except in (a) Mathematics, in which subject they may take either one stage in each of the two groups

[NOTE.—Copies of the Forms referred to in this Circular Letter may be obtained, after the 1st January, 1905, upon application to the offices of the Department.]

of stages into which the examination in this subject is divided, or Honours in Division I. and Division II. of Mathematics: and (b), Agricultural Science and Rural Economy, in which subject they may take the examination in one of Sections A, B, C, and one of Sections D, E, and F. of Stage 2. As Stage 1 of Subject VIII. (Sound, Light, and Heat) is common to the three sub-divisions into which the subject is divided for the advanced stages, candidates who take Stage 1 are not eligible to take, in the same year, Stage 2, Stage 3, or Honours of any of the three sub-divisions of the subject. When examinations are held concurrently in several subjects on the same evening, no candidate may take more than one of such subjects.

2. Examinations in Practical Chemistry (Subjects Xp. and XIp.), and in Practical Metallurgy (Subject XIp.), are held only in laboratories equipped in accordance with the requirements appended to the Board of Education's Syllabuses for these subjects. Where the number of candidates for examination working at the same time exceeds the number for which the laboratory is approved, the candidates may be examined in divisions. Not more than two such divisions will be allowed, and the number of candidates in each division working at the same time must not exceed the number for which the laboratory is approved.

Practical examinations for candidates in Honours in certain subjects may be held at South Kensington, or at some other centre, in addition to a written examination. Such practical examinations will be held as early as possible in June or July. Candidates who are instructed to attend these examinations at South Kensington or any other centre, receive a subsistence allowance of 7s. 6d. a night while required to be absent from home, and third-class railway fare; but no cab or omnibus fares are allowed.

3. Examinations in Drawing on the Blackboard will be held by Inspectors of the Department during the months of April, May and June, at approved centres. Applications for these examinations from Schools and Classes must be forwarded to the Department, on Form S. 135, on or before the 28th February.

As a rule no school will be made a centre of examination unless ten candidates are to be presented, but the Department will consider representations to hold examinations at schools which do not comply with this regulation.

4. The grades of success at the Examinations are "first-class" and "second-class."

Exceptions.—(1) In Section 1 of Stage 1 of Science Subjects XV. and XXIII. there is only one grade of success, viz.: "pass."

(2) In the Art subjects of Drawing and Modelling from the Life and Architectural Design there is a further grade of success, viz.: "excellent."

5. Applications for examination papers in Stage 1 of Science Subjects, and in Stage 1 of Design cannot be considered unless the application is accompanied by a sum of 1s. 6d. for each such paper asked for. For papers in Stage 1 of Practical Chemistry or Practical Metallurgy the fee will be 2s. 6d. per paper. No fee is exigible in respect of examinations in subjects of Art other than that in the Stage 1 of Design.

The number of papers requisitioned cannot be subsequently varied, and no part of the remittance is returnable.

The remittance of the fee for papers in Stage 1 must be made by Bank Draft, Cheque, or Postal Order, made payable to "The Accountant, Department of Agriculture and Technical Instruction for Ireland." *Stamps cannot be accepted.*

6. Managers of Schools who wish to present candidates for the local Science and Art examinations must provide accommodation, and propose to the Department arrangements for the examination of their students. The Department, however, reserve to themselves the right to revise the proposed arrangements, and to amalgamate the examinations in any district should they think it expedient.

7. External candidates (i.e., candidates who are not students of any school or class) must apply to the Department not later than the 24th February for Form S 101, upon which to make application for examination, and must then state whether they wish to take the evening or the day examinations. The special regulations as to the admission of external candidates to these examinations are printed separately upon Form S 100, copies of which may be had upon application.

Students of schools or classes must apply for examination through their Managers.

The Department will assign external candidates to a centre for examination and managers of schools at which examinations in a given subject are being conducted must admit such candidates to examination in that subject, on the authorisation of the Department, in such numbers as the Department, having regard to the available accommodation, may deem reasonable. Due regard will be had to the nature of the institution at which the examination is to be held when assigning external candidates to any centre.

8. Where managers of different institutions have classes in the same subject under their control they must arrange, where possible, for a conjoint examination of these classes in such manner that an unnecessary number of rooms may not be in use.

9. A separate examination will not, as a rule, be held where the number of candidates to be presented in any one subject is less than four, but the Department will be prepared, when in such cases the school from which the candidates come is distant from any larger centre, to consider proposals for holding a separate examination at the school.

10. The accommodation provided should be as follows:—

(a.) For examinations in all subjects of Science and in all subjects of Art, except those mentioned in (b), the accommodation should be such as to allow of the candidates' being seated not less than five feet apart from centre to centre. For examinations in subjects of Science it is desirable that rooms with level floors and without galleries should be used.

(b.) At examinations in the following subjects of Art:—Freehand Drawing in Outline, Model Drawing, Drawing in Light and Shade from a Cast, Drawing and Modelling from the Antique, Drawing and Modelling from Life, Modelling the Head from Life, and Painting from Still Life, candidates may be placed so as to be not less than two feet six inches apart from centre to centre.

11. Managers or their representatives must provide (for use in the examination in those subjects in which they are respectively required), ink, pens, ruled foolscap paper, pins or paper fasteners, tracing paper, and the necessary materials, such as stands, nails, &c., required for hanging up the casts for examination purposes in Drawing in Light and Shade and Modelling from the Antique.

12. Managers of Schools presenting students for examination must apply to the Department not later than the 24th February for Form S 102, upon which to make a return showing the number of papers required for each subject, and such other particulars as the Department may deem necessary. The return, which must be forwarded to the Department not later than the 28th February in the case of Evening Examinations, and not later than the 8th April in the case of Day Examinations, will be taken as final, and no further emendations can be allowed. Managers must state when applying for this form whether it is proposed that their students should take the evening or the day examinations.

13. The Managers will nominate on Form S 107, which will be issued a fortnight before the date fixed for the first examination, certain persons prepared to superintend the examinations. The superintendents may either be voluntary superintendents, or they may be remunerated by the Managers, after notice to the Department, at a rate not exceeding 2s. 6d. per hour of attendance necessary; the Department would not, however, approve of Managers making payments for such services to members of their own body. Candidates for examinations, their relatives, their teachers, or other persons who have a direct interest in the success of any candidate are ineligible to act as superintendents of examinations. Managers are held entirely responsible for the presence of superintendents to the number required at each examination, otherwise the examination may be held to be void.

14. The examination papers and the materials supplied by the Board of Education (South Kensington) for the examinations will be forwarded to the Examination Secretary.

The packets of examination questions must not, under any circumstances be permitted to pass into the hands of a teacher, of a candidate for examination, or of any other person interested in the success of the candidates.

15. Detailed instructions for the conduct of the examinations will be addressed to the Secretary and to the persons nominated as Superintendents.

16. The Department will issue to external candidates cards of admission to the examinations, and to the Secretary, blank cards of admission, which must be distributed amongst the candidates to be presented for examination from his school. A candidate who is unable to produce the card of admission, may not, except in special circumstances, be admitted to the examination room.

17. The Department may disallow examinations which afford evidence of not having been conducted in strict accordance with the regulations; they will investigate cases of suspected irregularity, and may require any or all of the candidates to be re-examined. If any

candidate should fail to appear at such investigation, or decline to be re-examined, all his previous examinations may be cancelled. When an examination has failed through no fault of the candidates, a re-examination may be allowed, the cost of which may be charged to the Managers. A re-examination will not be accepted for the purposes of Scholarships, &c.

18. All possible care is taken that the Examination Papers may be forwarded in accordance with the applications, and that the results may be issued correctly, but the Department cannot undertake to rectify mistakes, nor will they be responsible for any incidental loss.

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DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET,  
DUBLIN, December, 1904.

*Circular 33.*

*Local Scholarship Examinations.*

SIR,

As a scheme of scholarships has, with the approval of the Department, become part of the system of Technical Instruction of many County and Urban Committees, and as the Department, at the request of the Committees, have from time to time undertaken the examination of the candidates, it has been considered advisable to state, for the information of Committees, the arrangements which the Department propose to make in 1905 for the conduct of such examinations and the issue of results.

The examinations are conducted free of charge to Committees; the Department undertake the preparation of examination papers and the revision of answers; and they issue lists of candidates in order of merit to the Committees concerned.

The Department will not be prepared to hold, or to recognise, any other examinations for scholarships in 1905 than those enumerated below.

Committees will be required to find Superintendents for the examinations, and to arrange for suitable accommodation.

I.

FOR SCHOLARSHIPS TENABLE AT DAY SECONDARY SCHOOLS.

*On June 30th.*—This examination will be suitable for the award of County and Urban District Scholarships tenable at approved Day Secondary Schools.

The subjects and time of examination will be:—

Arithmetic,	.	.	.	11 a.m. to 12.30 p.m.
English,	.	.	.	1 p.m. to 2.15 p.m.
Drawing,	.	.	.	2.30 p.m. to 3.30 p.m.

### FOR SCHOLARSHIPS TENABLE AT TRADE PREPARATORY SCHOOLS.

*On June 28th.*—This examination will be suitable for the awards of Scholarships tenable at, and for entrance qualification to, Day Trade Preparatory Schools, working under the Department's Regulations.

The subjects and time of examination will be:—

English,	. . . . .	10 a.m. to 12 noon.
Arithmetic,	. . . . .	12.30 p.m. to 2.30 p.m.
Drawing,	. . . . .	2.45 p.m. to 4 p.m.

### III.

### FOR SCHOLARSHIPS TENABLE AT RESIDENTIAL SCHOOLS OF DOMESTIC ECONOMY.

*On June 28th.*—This examination has been arranged for the convenience of those Committees which have decided that such Scholarships shall be awarded as the result of a competitive examination. It will be suitable for the award of Scholarships tenable at, and for entrance qualification to, such Residential Schools of Domestic Economy as are working under the Department's Regulations.

The subjects and time of examination will be:—

Arithmetic,	. . . . .	10.30 a.m. to 12.30 p.m.
English (including General Knowledge),	. . . . .	1 p.m. to 3 p.m.
Drawing,	. . . . .	3.10 p.m. to 4.10 p.m.

The syllabuses of examination are printed as an Appendix to this Circular Letter.

I am, Sir,

Your obedient Servant,

T. P. GILL,

*Secretary.*

The Principal Executive Officer,  
Technical Instruction Committee.

### APPENDIX.

#### SYLLABUSES OF EXAMINATIONS.

The Syllabuses are the same for each of the examinations mentioned in the Circular Letter, but a higher standard of work will be looked for in the Trade Preparatory School Scholarship and Entrance Examination than in the other examinations.

Candidates may be examined on any part of these Syllabuses.



**ARITHMETIC:**

The principles of Vulgar and Decimal Fractions, with examples involving addition, subtraction, and multiplication.  
 Proportion, Simple Interest, Practice, Unitary Method.  
 The Metric System.  
 Methods of Weighing and Measurement.  
 Measurement of lengths, areas, and volumes.

**ENGLISH:**

Composition. A short essay or letter, of thirty or forty lines—with correct spelling, grammar, and punctuation—on some familiar subject.  
 Ability to answer in fully-formed sentences questions on the meaning of words and phrases, and on the matter of a passage read.  
 Grammar. The construction of words; prefixes, affixes, and roots.  
 Analysis of simple and complex sentences.  
 Correction of faulty sentences.  
 Paraphrasing a short poetical extract.

**GENERAL KNOWLEDGE:** (*For Domestic Economy Scholarship Examinations.*)

Questions on familiar subjects which a pupil would be expected to be acquainted with from home or school life, and from general observation and reading.

**DRAWING:**

1. Freehand Drawing.
2. Simple exercises in Design.
3. Model Drawing of Simple Common Objects.
4. Simple Geometrical Drawing.
5. Memory Drawing.

DEPARTMENT OF AGRICULTURE AND  
 TECHNICAL INSTRUCTION FOR IRELAND,  
 UPPER MERRION-STREET,  
 DUBLIN, *December, 1904.*

*Circular 34.*

**EXHIBITION OF DRAWINGS AND ART-WORK, 1905.**

SIR (OR MADAM),

The Department propose to hold in July, 1905, an exhibition of Drawings and Art Work to be representative of the work done in Day Secondary Schools, Art Classes, and Schools of Art, and they invite your kind assistance and co-operation in making the Exhibition successful.

The Exhibition will be held in Dublin, and it is hoped that those attending the Short Summer Courses of Instruction to Teachers, in Dublin, as well as the general public, will thus be enabled to visit it.

I have to direct your attention to the rules in the Appendix to this communication, the careful observance of which is necessary to secure a uniform series of exhibits. Failure to observe these rules may necessitate the refusal of works executed.

I am,

Sir (or Madam),

Your obedient Servant,

T. P. GILL,

*Secretary.*

#### APPENDIX.

##### DAY SECONDARY SCHOOLS.

1. All drawings must be mounted on sheets of brown paper 32 inches by 24 inches, which will be supplied to schools by the Department. Drawings which are not thus mounted cannot be exhibited.

2. Schools submitting first year work only will be allowed two sheets; schools submitting first and second year work will be allowed four sheets; schools submitting first, second, and third year work will be allowed six sheets, and schools submitting first, second, third, and fourth year work will be allowed eight sheets. These numbers must not be exceeded.

3. All drawings should be mounted so that the sheets can be hung with the long dimension upright.

4. The drawings should be selected to illustrate as far as possible the course of work followed during the year.

5. In mounting the drawings, the different kinds and stages of work should be kept together.

6. Each drawing should bear the name and age of the pupil and the course of instruction followed (*i.e.*, first, second, third, or fourth year) in the lower left-hand corner, on the label to be supplied by the Department, and must be entirely the work of that pupil done during the session 1904-5.

7. Schools in which modelling is taught may submit, in addition to the sheets allowed above, three casts of work executed by the pupils. The casts may be made by the teacher. Casts must not exceed two feet in any dimension.

8. The work submitted must have been executed in Day Secondary Schools only.

9. Teachers may submit a signed scheme of work. This should be typewritten, and should not occupy more than one side of a double sheet of foolscap. This scheme of work should be attached to the bottom of one of the sheets. Three prizes of books will be awarded for the best schemes of work, to the value of, 1st prize, £2; 2nd prize, £1; 3rd prize, 10s.

10. Applications for sheets of brown paper, labels, &c., must be made on Form S 128 not later than April 30th, 1905. The supply will be forwarded to the schools early in June. Copies of the form referred to may be obtained after the 1st March, 1905.

11. All exhibits must be forwarded to reach the Offices of the Department not later than June 25th.

12. The Department will pay expenses incurred in sending and returning drawings and casts, but only to the extent mentioned above.

#### SCHOOLS OF ART AND EVENING CLASSES.

Exhibits should be strictly limited in amount, and should be such as to give a general idea of the school work, showing, specially, examples of any branch of work to which particular attention is paid. It is desirable that examples of applied art work, such as wood-carving, metal work, enamelling, &c., should be shown.

The amount of space available for each school cannot be determined exactly in advance, but it may be taken that the average exhibit should not exceed 50 square feet.

### METROPOLITAN SCHOOL OF ART, DUBLIN.

#### *TEACHERSHIPS-IN-TRAINING, 1905.*

##### Form S. 2.

A limited number of Teacherships-in-Training, tenable at the Metropolitan School of Art, Dublin, will be open for competition at the beginning of the Session 1905-6.

The object of the Teacherships-in-Training is to encourage capable Art students to undertake such a course of training as will enable them to become Art Teachers.

The Teacherships-in-Training will entitle the holders to free admission to all the day and evening classes at the Metropolitan School of Art for the Session 1905-6; a maintenance allowance of 21s. per week during the session (about forty weeks); and third-class railway fare for one journey to and from Dublin.

The Teacherships will be awarded partly as the result of an examination, and partly for works submitted according to the conditions stated below.

The examination will be confined to Art subjects, and will be held at the Metropolitan School of Art, Dublin, on Tuesday, Wednesday, and Thursday, the 4th, 5th, and 6th July, 1905.

Candidates must themselves bear any expenses incurred by them in connection with attendance at the examination.

Teacherships will not be awarded to candidates who do not show in the course of the examination that they are capable of taking full advantage of the instruction provided at the Metropolitan School of Art, and in particular, candidates with physical defects of voice, sight, or hearing, will not be regarded as eligible. In awarding the Teacherships preference will be given to candidates who possess the Art Class Teachers' Certificate (Board of Education), or the Irish Secondary Teachers' Honours Drawing Certificate.

The award will be made on the following conditions:—

(1.) Candidates must be not less than eighteen and not more than thirty years of age on the 1st September, 1905. The Department may allow a modification of this rule in special cases.

(2.) Successful candidates will be required to furnish a medical certificate of health, an authenticated copy of certificate of birth, and satisfactory testimonials from two responsible persons.

(3.) Candidates must satisfy the Department that they have had a good general education.

(4.) Candidates must have been born in Ireland, or have been resident in Ireland for three years prior to the 1st September, 1905.

(5.) Successful candidates will be required to prepare, in conjunction with the Headmaster of the School, a scheme of study; and to submit it for the Department's approval. They will be required to devote their whole time to the work of this scheme; to attend regularly and punctually; and generally to comply with the regulations set out in the programme of the Metropolitan School of Art. They must be prepared, if required, as part of their training, to undertake such work as teachers as the Headmaster may prescribe.

(6.) The Teacherships may be renewed for a second session. Renewal will depend upon the ability and application shown by the student during the previous Session, and on the scheme of study proposed by the student when applying for renewal for a second Session.

(7.) The Department reserve the right at any time to determine, without notice, any Teachership upon being satisfied that its continuance is for any reason undesirable.

(8.) The decision of the Department in all questions arising in connection with Teacherships shall be final.

(9.) The Department do not undertake to employ Teachers, nor to find employment for them, at the close of the period of training.

The names of the candidates must be forwarded, on Form S. 3, so as to reach the Offices of the Department not later than the 29th April, 1905. Applications for forms are not regarded as applications for admission to the examination. Only those candidates who present an official acknowledgment of the form of application will be admitted to the examination room.

Copies of Form S. 3 may be obtained, after 1st February, 1905, upon application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, or to the Registrar, Metropolitan School of Art, Kildare Street, Dublin.

#### SUBJECTS OF EXAMINATION.

The subjects and time table of the examination will be:—  
*First Day, Tuesday, July 4th—*

10 a.m. to 2 p.m.—Drawing from the Antique (100 marks.)

3 to 4 p.m.—Geometrical Drawing (Art). 50 marks.)

*Second Day, Wednesday, July 5th—*

10 a.m. to 1 p.m.—Drawing in Light and Shade from a Cast. (50 marks.)

2 to 4 p.m.—Perspective. (50 marks.)

4.15 to 5.15 p.m.—Drawing on the Blackboard. (50 marks.)

*Third Day, Thursday, July 6th—*

10 a.m. to 2 p.m.—Drawing, or Modelling, Design. (100 marks.)

3 to 5.30 p.m.—Model Drawing. (50 marks.)

For syllabuses of the subjects of examination, see "Syllabuses and Lists of Apparatus" of the Board of Education for 1904-5, to be obtained (price 4d.), either directly, or through any bookseller, of Mr. E. Ponsonby, 116 Grafton-street, Dublin. [Drawing from the Antique (page 190); Geometrical Drawing (Art), page 186; Drawing in Light and Shade from a Cast, page 184; Perspective, page 187; Drawing on the Blackboard, page 186; Drawing Design (Stage 1), page 195; Modelling Design (Stage 1), page 200; Model Drawing, page 182.]

## WORKS.

In order to encourage Art students to devote much attention to what should be the primary aim of their higher instruction, namely, the application of their skill, experience, and good taste to works requiring more time and care than the ordinary conditions of an examination room permit, marks, to a maximum of 225, will be awarded for works of the same character as those proposed for the Irish Secondary Teachers' Honours Drawing Certificate. (*See extract below.*)

Works to be submitted for the competition must be delivered at the Metropolitan School of Art, Dublin, on or before Saturday, the 1st July, 1905. They should be addressed, "The Registrar, Metropolitan School of Art, Dublin," and should be specially marked. "Works, Teacherships-in-Training."

*Extract from Circular 16 (Irish Secondary Teachers' Drawing Certificate).*

## WORKS.

(1.) "An imperial sheet of three designs, based on a study in colour of a growing plant. The plant should be drawn from nature simply and directly—not pictorially represented. Such details of the plant as the student may select for the purposes of the designs should, if required, be drawn separately.

"The designs must occupy, in a decorative way, a square, a circle, and an oblong, one being in monochrome, one in two colours, and one in polychrome. At least one of the designs must be executed in body colour or tempera. In each case the plant must be not merely applied to the given space, but treated in accordance with decorative conditions.

(2.) "A modelled study of a flowering plant, with three distinctly different modelled designs for patterns based on it. Each of these three different designs must be suited to the technical requirements of three different processes of manufacture. The process and material for which it is intended must be named on each design. The four studies to be on a panel 30 inches by 22 inches.

(3.) (a.) "A shaded drawing of a complete human figure from the Antique or from Life; or

(b.) "Shaded drawings of a head, hand and foot, from the Life, full size; completely finished in pencil, chalk, or brush in monochrome; or

(c.) "A modelled figure in the round, 30 inches high, from the Antique or from Life; or

(d.) "A modelled head, from Life, full size."

DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION STREET,  
DUBLIN.

Form S 33.

ROYAL COLLEGE OF SCIENCE, DUBLIN.

SCIENCE AND TECHNOLOGICAL SCHOLARSHIPS, 1905.

A limited number of Scholarships and of Teacherships-in-Training, tenable at the Royal College of Science, Dublin, will be offered for competition among students of Science and Technology in 1905.

The Scholarships are of the value of £50 per annum, and, in addition, entitle the holder to free instruction during the Associate Course, and third-class railway fare for one journey each session to and from Dublin.

A Teachership-in-Training entitles the holder to free instruction during the Associate Course, a maintenance allowance of 21s. per week for the session of about forty weeks each year, and third-class railway fare for one journey each session to and from Dublin.

The Associate Course extends over three years, and the College Session lasts from the beginning of October until the end of June each year.

Holders of Scholarships and Teacherships-in-Training will be required to devote their whole time to the work of the Associate Course, to comply with the regulations of the College, and to pass the examinations required for the Associateship. The continuance of the Scholarship or Teachership-in-Training for a second or a third session will depend upon the ability and application which the student has shown during the previous session or sessions at the College.

Candidates for Scholarships and Teacherships-in-Training must be not less than sixteen nor more than thirty years of age on the 1st June, 1905. Holders of Royal Exhibitions or National Scholarships, and present or past students of the Royal College of Science, are ineligible as candidates.

Candidates must have been born in Ireland, or have been resident in Ireland for three years prior to the 1st June, 1905.

Candidates will have to satisfy the Department as to their knowledge of English and of one other language (Greek, Latin, Irish, French, or German). In these subjects a pass in the Senior Grade of the Intermediate Education Board's Examinations, in the First Arts Examination of the Royal University of Ireland, or the equivalent of these, will be accepted as satisfactory. Those candidates who cannot thus satisfy the Department as to their knowledge of the qualifying subjects will be examined on the Pass Course for the Senior Grade of the Intermediate Education Board's Examinations of 1905.

NOTE.—Text Books other than those referred to in the Syllabuses, are not prescribed for the examination.

The competition will be confined to Mathematics, Experimental Science, and Drawing.

The Syllabus in Mathematics will be the Pass Courses in Algebra and Arithmetic, Geometry, and Trigonometry for the Senior Grade of the Intermediate Education Board's Examinations of 1905; in Experimental Science, the Syllabuses (both Third and Fourth Years) of the Special Courses of Experimental Science of the Department's Programme for Day Secondary Schools; and in Drawing, the First and Second Year Syllabuses of the Programme for Day Secondary Schools.

In Experimental Science, candidates will be allowed the choice of one of the following subjects:—Physics, Chemistry, Mechanical Science, Botany, Geology, Physiology and Hygiene.

The examination will be held in Dublin on the days and at the hours shown below:—

*Tuesday, 4th July.*—English, 10 a.m. to 1 p.m.; Greek, Latin, Irish, French, or German, 2 p.m. to 5 p.m.

*Wednesday, 5th July.*—Mathematics, 10 a.m. to 1 p.m.; Experimental Science (Written Test), 2 p.m. to 5 p.m.

*Thursday, 6th July.*—Experimental Science (Practical Test), 10 a.m. to 1 p.m.; Drawing, 2 p.m. to 5.10 p.m.

Candidates must themselves bear any expenses incurred by them in connection with attendance at the examination.

Scholarships or Teacherships-in-Training will not be awarded to candidates who do not show in the course of the examination that they are capable of taking full advantage of the instruction provided at the Royal College of Science. Candidates with physical defects of voice, sight, or hearing, will not be regarded as eligible for Teacherships-in-Training.

Successful candidates will be required to furnish a Medical Certificate of Health, an authenticated copy of Certificate of Birth, and satisfactory testimonials from two responsible persons.

The Department reserve the right at any time to determine, without notice, a Scholarship or Teachership-in-Training, upon being satisfied that its continuance is for any reason undesirable.

The decision of the Department in all questions arising in connection with the Scholarships and Teacherships-in-Training shall be final.

The Department do not undertake to employ teachers, nor to find employment for them, at the close of the period of training.

Applications for admission to the examination must be made, not later than the 29th April, on Form S. 34, copies of which may be obtained, after the 1st February, 1905, upon application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin, or to the Registrar, Royal College of Science, St. Stephen's Green East, Dublin.

Applications received after the 29th April will be too late for consideration. Applications for Forms are not regarded as applications for admission to the examination. Only those candidates who present an official acceptance of the Form of Application will be admitted to the Examination Room.

## IRISH TRAINING SCHOOL OF DOMESTIC ECONOMY.

*TEACHERSHIPS-IN-TRAINING, 1905.*

Form S 89.

The Department will award in July, 1905, not more than (a) ten Open Scholarships, and (b) ten Limited Scholarships, to assist Domestic Economy Students in undertaking the full course of Instruction at the Irish Training School of Domestic Economy, Kildare-street, Dublin.

Scholarships will entitle the holders to free admission to the full course of training as Teacher of Domestic Economy subjects. The School is not residential, and no subsistence allowance is given.

The Scholarships will be awarded as the result of a competitive examination, partly written, partly *viva voce*, to be held in Dublin, Belfast, Cork, and Galway, on Tuesday, the 4th July, 1905, beginning at 10 a.m. Should a sufficient number of Candidates present themselves, examinations will also be held at Londonderry, Sligo, Limerick, and Waterford.

The award will be made on the following conditions :—

1. Candidates must be not less than nineteen and not more than thirty years of age on the 1st September, 1905. This rule will be strictly adhered to.
2. Candidates with physical defects of voice, sight, or hearing will not be regarded as eligible for Scholarships. Successful candidates will be required to furnish a medical certificate of health, an authenticated copy of certificate of birth, and satisfactory testimonials from two responsible persons.
3. Candidates must satisfy the Department that they have had a good general education.
4. Candidates for either class of Scholarship must have been born in Ireland, or have been resident in Ireland for three years prior to the 1st September, 1905.
5. The Subjects and Time Table of the Examination will be :—  
 Arithmetic (General) 10 a.m. to 11.45 a.m.  
 English, 12 noon to 1.45 p.m.  
 Irish, French, or German, 2.15 p.m. to 4 p.m.  
 Reading aloud. At some time during the progress of the examination the Candidate will be asked to read aloud a passage of English prose of not more than ordinary difficulty.



The standard will be equivalent to that required for a pass in the Middle Grade of the Intermediate Education Board's Examinations. Questions will not, however, be set from any prescribed text-books.

6. Twenty-five marks will be the maximum assigned for reading aloud ; one hundred marks for Arithmetic ; one hundred marks for English, and one hundred marks for the other language. Candidates must intimate in their form of application whether they propose taking Irish, French, or German.
7. Candidates must themselves bear any expenses incurred by them in connection with attendance at the examination.
8. The selection of the Students-in-Training will, in the first instance, be provisional. Those selected will take a number of trial lessons at the Training School ; the final award of a Scholarship will be made by the Department on receipt of the report from the Training School, and is subject to the condition that the Student shows in the trial lessons that she is capable of making full use of the instruction provided at the Training School, and that she is generally suitable for employment as a teacher.
9. After final selection Students-in-Training must take up that course which will most suit the convenience of the Training School.
10. The Department reserve the right at any time to determine, without notice, any Scholarship, upon being satisfied that its continuance is for any reason undesirable.
11. The Students-in-Training must conform to the regulations of the Irish Training School of Domestic Economy.
12. Candidates who accept Scholarships, but leave the school before the completion of their course of training, will be required to pay the fees for the period during which they were in attendance at the school.

**THE Limited Scholarships** are intended as rewards to students for successful attendance and work at Local Technical Schools or Classes, under the direction of properly constituted Technical Instruction Committees of Local Authorities who had a Scheme of Technical Instruction in operation during the Session 1904-5. The Limited Scholarships will entitle the holders to free admission to the full course of training as Teacher of Domestic Economy subjects, provided that the Local Technical Instruction Committee who nominate the Candidate undertake to pay ten guineas, being half the fees for the full two years' course of instruction. Nominations must be made, not later than the **19th June**, upon Form S 171, which must also contain an account of attendance and work done at Local Technical Schools and Classes. Candidates who have not attended such courses will be ineligible for these Scholarships.

**THE Open Scholarships** will, in the first instance, subject to the terms of the conditions of award on page 1, be offered provisionally to the ten Candidates who stand highest on the examination list. Should one of the ten successful Candidates decline to accept a Scholarship it may be offered to the next in order of merit, and so on.

**THE Limited Scholarships** will be offered to Candidates in order of merit who are not successful in obtaining Open Scholarships, and who have been nominated by the above-mentioned properly constituted Committees.

For the present Competition not more than one Candidate thus nominated by any Technical Instruction Committee will be awarded a Limited Scholarship. Should, however, a Candidate nominated for a Limited Scholarship, be successful in obtaining an Open Scholarship, another Candidate nominated by the same Technical Instruction Committee will be eligible for a Limited Scholarship, and so on.

The decision of the Department in all questions arising in connection with these Scholarships must be considered as final.

**PROSPECT OF FUTURE WORK.**—Candidates who attend regularly and punctually the full course of instruction at the Training School and pass all the examinations held during the course will obtain a diploma from the Department at the end of their course of training. These diplomas are recognised by the Department as evidence of qualification to teach under Technical Instruction Committees of Urban or County Councils. They will also be regarded as evidence of qualification to teach the Department's Programme of Domestic Economy in Day Secondary Schools.

The Department do not undertake to employ, or to find employment for, teachers at the close of the period of training.

The names of the Candidates for both Limited and Open Scholarships must be forwarded on Form S. 170, so as to reach the offices of the Department not later than the 29th April, 1905. Applications for Forms are not regarded as applications for admission to the examination. Only those Candidates who present an official acceptance of the form of application will be admitted to the examination rooms.

Copies of Form S. 170 and of Form S. 171 may be obtained upon application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion Street, Dublin, after the 1st February, 1905.

FORM S. 114.

## LOCAL SCIENCE AND ART EXAMINATIONS, 1905.

## EXAMINATION CENTRES.

This list of Examination Centres is issued for the information of Students desiring to present themselves for examination as External Candidates at the Local Science and Art Examinations to be held in April, May, and June, 1905. The list contains the names of all the schools at which these examinations were held in 1904. In all probability similar examinations will be held at the same centres in 1905, but there may not be examinations at some of these centres. On the other hand, examinations may be held at new centres, *i.e.*, centres not mentioned in this list.

The Department cannot guarantee that examinations in the subjects stated, or in any other subjects, will be held at the centres mentioned, and they cannot give any further information with regard to probable centres.

(NOTE.—F=Freehand Drawing of Ornament in Outline; L.=Drawing in Light and Shade from a cast; M.=Model Drawing; G-D.=Geometrical Drawing (Art); P.=Perspective; P.-F.=Memory Drawing of Plant Form; B.-B.=Drawing on the Blackboard. Science Subjects are designated by the numbers given them in "Syllabuses and Lists of Apparatus" of the Board of Education for 1904-5.)

## EVENING EXAMINATIONS AND EXAMINATIONS IN DRAWING ON THE BLACKBOARD.

Centre Number.	Name of Centre.	Subjects in which Examinations were held.	
		Science.	Art.
	<b>LEINSTER.</b>		
	<b>CO. CARLOW—</b>		
6247	Bagenalstown: Presentation Convent.	—	Design.
6356	Tullow: Brigidine Convent.	—	B.-B.
6107	Tullow: St. Patrick's Seminary.	—	F., L., M., and G.-D.
	<b>CO. DUBLIN—</b>		
6248	Blackrock Municipal Technical Schools.	Subjects III., X., Xp. (Stage 2), and XXV.	—
6163	Kingstown: Municipal Technical School.	Subject III.	F. and M.
6096	Rathfarnham: Loreto Abbey,	—	B.-B.
	<b>Co. BOROUGH OF DUBLIN:</b>		
6143	Christian Brothers' Novitiate. Marino, Clontarf.	—	F., L., M., G.-D., B.-B., and Design.
6647	Church Home School,	—	F.
6010	City of Dublin Technical Schools.	Subjects I., II., III., V. (Div. I.), VII., VIII., IX., X. Xp. (Stage 1), Xp. (Stage 2), XI., XXII. and XXIII.	F., L., M., G.-D., B.-B., and Design.

## EVENING EXAMINATIONS.

Centre Number.	Name of Centre.	Subjects in which Examinations were held.	
		Science.	Art.
	CO. BOROUGH OF DUBLIN— <i>con.</i>		
6082	Dominican Convent, Eccles- street.	—	Design.
6065	Loreto College, Stephen's Green.	—	B.-B. and Design.
6019	Metropolitan School of Art, .	—	F., L., M., G.-D., P., P.-F., B.-B., Anatomy, Architecture, De- sign, Drawing from the Antique, Draw- ing of Common Ob- jects from Memory, Drawing from Life, Historic Ornament, Modelling Design, Stage 2), Modelling Design (Honours), Modelling from Life, Modelling from the Antique, Modelling the Head from Life, Painting from Still Life, Painting Orna- ment, and Principles of Ornament.
6033	Royal College of Science, . .	Subjects I., II., III., V. (Divn. I.), V. (Divn. II.), Vp., VIA., VII., VII., VIII., VIII., VIII., VIII., IX., X., Xp. (Stages 2 and 3), XI., XIV., XVI., XVII., XX., XXII., XXIV., and XXV.	Historic Ornament.
	CO. KILDARE—		
6217	Athy Christian Brothers' Schools.	Subject I., . .	G.-D. and Design.
6346	Athy. St. Mary's School, Con- vent of Mercy.	—	F., L., and M.
	CO. KILKENNY—		
6458	Goresbridge: Brigidine Con- vent.	—	F. and Design.
6607A	Kilkenny: Model School, .	—	F. and M.
6607	Kilkenny: Technical School, .	—	G.-D.
	CO. LOUTH—		
6416A	Drogheda: Mayoralty Rooms,	—	F.
6416	Drogheda: Municipal Techni- cal Schools.	Subjects I., III., IX., and XXII.	L., M., G.-D. and B.-B.
6173	Dundalk: Christian Brothers' Schools.	—	F., L., M. and G.-D.
6360	Dundalk: Convent of Mercy, .	—	F., L., M., G.-D., and Design.
6052	Dundalk: Railway Works Class Room.	Subject II., . .	—
6416	Dundalk: Technical School, .	Subjects I., II., III., V. (Divn. I.), VII., IX., and XXII.	G.-D. and P.
	QUEEN'S COUNTY—		
6310	Abbeyleix: Brigidine Convent,	—	B.-B.
6369	Mountrath: Brigidine Convent,	—	G.-D., P.-F., and Design.
6106	Mountrath: Monastery School,	—	B.B.

## EVENING EXAMINATIONS.

Centre Number.	Name of Centre.	Subjects in which Examinations were held.	
		Science.	Art.
	CO. WEXFORD—		
6249	Enniscorthy: Loreto Convent,	—	Design.
6620	Enniscorthy: Market House.	—	F., L., M., and G.-D.
6606	New Ross: Convent of Mercy,	—	F., L., M., G.-D., and B.-B.
6347	Wexford: Municipal Technical School.	Subjects L, Vp., X., and Xp. (Stage 1)	F., L., M., G.-D., B.-B., and Design.
	CO. WICKLOW—		
6457	Bray: Technical School,	—	F.
	MUNSTER.		
	CO. CLARE—		
6003	Ennis: St. Mary's School, Convent of Mercy.	—	F. and M.
	CO. CORK—		
6012	Blackrook: Ursuline Convent,	—	F., L., M., G.-D., B.-B., and Design.
6149	Clonakilty: Convent of Mercy,	Subject XXV.,	—
6308	Fermoy: Loreto Convent,	—	F., L., M., G.-D., and Design.
6043	Kinsale: Convent of Mercy,	—	F., L., M., Drawing of Common Objects from Memory and Design.
6509	Macroom: Convent of Mercy,	—	Design.
6131	Midleton: Christian Brothers' Schools.	—	F., L., M., G.-D., B.B., and Design.
6581	Queenstown: Convent of Mercy.	—	L., M., and B.-B.
6081	Queenstown: Presentation Brothers' College.	Subjects II., III., and Vp.	F. and M.
6328	Youghal: Christian Brothers' School.	—	Design.
6434	Youghal: Presentation Convent.	—	F. and M.
	CO. BOROUGH OF CORK—		
6013	Christian Brothers' Schools, Our Lady's Mount.	Subject X.,	F., M., G.-D., B.-B., Design, Historic Ornament, and Principles of Ornament.
6003	Crawford Municipal Technical Institute.	Subjects I., II., III., IV., V. (Divn. I.), Vp., VIA., VII., VIII., IX., X., Xp. (Stage 1), Xp. (Stage 2), Xp. (Stage 3), XL, XIp. (Stage 1), XVII., XX., and XXII.	F., L., M., G.-D., P.F., B.-B., Anatomy, Design, Drawing of Common Objects from Memory, Drawing from Life, Drawing from the Antique, Drawing the Antique from Memory, Historic Ornament, Modelling Design (Stage 2), Modelling from Life, Modelling from the Antique, Modelling the Head from Life, Painting from Still Life, Painting Ornament, and Principles of Ornament.

## EVENING EXAMINATIONS.

Centre Number.	Name of Centre.	Subjects in which Examinations were held.	
		Science.	Art.
CO. BOROUGH OF CORK—con.			
6320	Presentation Brothers' Monastery, Mount St. Joseph.	—	B.-B. and Design.
6057	St. Aloysius' School, St. Marie's of the Isle.	—	B.-B. and Design.
6024	St. Vincent's Convent, St. Mary's-road.	—	B.-B. and Design.
6138	Ursuline High School, St. Angela's.	—	B.-B.
CO. KERRY—			
6048	Killarney: Loreto Convent.	Subject XVII.,	B.-B. and Design.
6680	Killarney: Technical School.	—	F.
6678	Listowel: Technical School.	—	F.
6571	Tralee: Central Technical School.	Subjects I., II., and III.	F., L., M., and P.
6068	Tralee: Presentation Convent.	—	B.-B.
CO. BOROUGH OF LIMERICK—			
6039B	Athenaeum Hall, Cecil-street.	Subject IX.,	F. and Drawing of Common Objects from Memory.
6160	Christian Brothers' Schools, Sexton-street.	—	F., M., and B.-B.
6039	Municipal Science, Art, and Technical School, 69 George-street.	Subjects II., III., Vp., VII., Xp. (Stage 1), XI., XIp. (Stage 1), and XXV.	—
6039A	School of Art, Cecil-street.	Subject X.,	L., M., G.-D., P., P.-F., B.-B. and Design.
CO. TIPPERARY—			
6147	Oashol: Presentation Convent.	—	P.-F., B.-B., and Design.
6556	Clonmel: Central Technical School.	Subject III.,	F., L., M., B.-B., P.-F., Design and Drawing of Common Objects from Memory.
6069	Thurles: Ursuline Convent.	Subjects V. (Divn. I.) and IX.	F.
6183	Tipperary: Christian Brothers' Schools.	Subject III.,	—
CO. BOROUGH OF WATERFORD—			
6118	Christian Brothers' Schools, Mount Sion.	Subjects I., III., VIA, X., and Xp. (Stage 1).	F., L., M., G.-D., B.-B., P., P.-F., Design, and Drawing of Common Objects from Memory.
6084	Convent of the Sacred Heart of Mary, Ferrybank.	Subject V. (Divn. I.).	F., L., M., P., B.-B., and Design.
6100	St. Anne's High School, Ursuline Convent.	—	F., M., B.-B., and Design.
ULSTER.			
CO. ANTRIM—			
6358	Ballymena: Technical School.	Subjects II., V., (Divn. I.), VIII., IX., X., and XXII.	F., L., M., G.-D., P.-F., B.-B., Design, Modelling from the Antique, and Painting from Still Life.

## EVENING EXAMINATIONS.

Centre Number.	Name of Centre.	Subjects in which Examinations were held.	
		Science.	Art.
	CO. ANTRIM— <i>con.</i>		
6244	Ballymoney: Intermediate School.	—	F., L., M., G.-D., and Design.
6232A	Larne: Female National School.	Subjects III., V., (Divn. I.), IX., XIV., and XXV.	F. and M.
6199	Larne: Grammar School.	Subjects X., Xp., (Stage 1), Xp. (Stage 2).	—
6028	Lisburn: Convent of the Sacred Heart of Mary.	—	Design.
6114	Lisburn: Ulster Provincial School.	Subjects V. (Divn. I.), VIA., VIB., X., Xp. (Stage 1).	F., M., & Design.
	CO. BOROUGH OF BELFAST—		
6227	Municipal Technical Institute, College Square, North.	Subjects V. (Divn. I.), V. (Divn. II.), Vp., VII., IX., XI., XIV., XVII., XIX., XXII., XXIII., and XXV.	—
6227C	Queen's College.	Subjects Xp. (Stage 1), and Xp. (Stage 2).	—
6227A	School of Art, North-street.	Subjects I., IV., VIA., VII., VIII., VIIIA., VIIIB., VIIIC., XII., and XX.	F., L., M., G.-D., P., P.-F., B.-B. Anatomy, Architecture, Architectural Design, Design, Drawing of Common Objects from Memory, Drawing from Life, Drawing from the Antique, Drawing the Antique from Memory, Historic Ornament, Modelling Design (Stage 2), Modelling from Life, Modelling from the Antique, Modelling the Head from Life, Painting from Still Life, Painting Ornament, and Principles of Ornament.
6227B	Working Men's Institute.	Subjects II., III., X., and XIp. (Stage 1).	—
	CO. ARMAGH—		
6038	Armagh: Natural History and Philosophical Society's New Art Rooms, the Mall.	—	F., L., M., G.-D., P., P.-F., Design, and Painting from Still Life.
6433	Lurgan: Convent of Our Lady of Mercy.	—	F., L., M., G.-D., P., P.-F., B.-B. Design, Historic Ornament, and Principles of Ornament.
6367	Lurgan: Municipal Technical School.	Subject V. (Divn. I.),	F., L., M., and B.-B.
6574	Portadown: Municipal Technical School.	Subjects III., and V. (Divn. I.),	—
	CO. DOWN—		
6582	Banbridge: Technical School.	Subject V. (Divn. I.),	M. and G.-D.
6587	Bangor Technical School.	Subject III.,	F., L., M., and B.-B.
6572	Hollywood Technical School.	Subjects V. (Divn. I.), X., Xp. (Stage 1), and Xp. (Stage 2).	F. and M.

## EVENING EXAMINATIONS.

Centre Number.	Name of Centre.	Subjects in which Examinations were held.	
		Science.	Art.
	CO. DOWN— <i>con.</i>		
6544	Newry: Municipal Technical School.	Subjects I., II., III., V. (Divn. I.), V <sub>p</sub> , VIA., VII., VIII., VIIIA., IX., XXIII., and XXV.	F., L., M., G.-D., B.-B., and Design.
6092	Newry: St. Colman's College.	Subjects V. (Divn. I.), VIB., VIIIB., VIIIC., and X.	—
6845	Newtownards: Technical School.	Subjects II., III., and VII.	F.
	CO. LONDONDERRY—		
6235A	Coleraine: Masonic Hall.	—	L.
6235	Coleraine: Technical School.	Subjects I., III., V. (Divn. I.), VIA., VIB., VIII., IX., and X.	F., M., G.-D., and P.-F.
	CO. BOROUGH OF LONDONDERRY—		
6549	Londonderry: Convent of Our Lady of Mercy.	—	B.-B.
6037	Londonderry: Municipal Technical School.	Subjects I., II., III., V. (Divn. I.), V <sub>p</sub> , VIA., VIB., and IX.	F., L., M., G.-D., P., P.-F., B.-B., Anatomy, Design, Modelling Design (Stage 2), Painting Ornament, and Principles of Ornament.
6109	Londonderry: Strand House School.	Subjects X. and X <sub>p</sub> . (Stage 1).	—
	CO. MONAGHAN—		
6225	Monaghan: St. Louis Convent.	—	F., L., M., G.-D., and B.-B.
	CO. TYRONE—		
6332	Cookstown: Academy.	—	F.
6581	Dungannon: Technical School.	Subjects V <sub>p</sub> and IX.	F. and M.
6211	Omagh: Loreto Convent.	—	F., M., G.-D., and Design.
6707	Omagh: Urban Council Rooms.	—	F. and G.-D.
6708A	Strabane: Bridge End School.	—	F. and G.-D.
	CONNAUGHT.		
	CO. GALWAY—		
6066	Galway: City of Galway Technical Institute.	Subjects I., III., and X.	F., L., M., G.-D., P.-F., B.-B., Design, Drawing of Common Objects from Memory, and Painting Ornament.
6067	Galway: Dominican Convent Taylor's-hill.	Subjects V. (Divn. I.), and X.	M., G.-D., B.-B., Design, and Architecture.
6073	Gort: Convent of Mercy.	—	B.-B.
	CO. MAYO—		
6202	Kiltimagh: St. Louis Convent.	—	B.-B.
	CO. SLIGO—		
6197	Sligo: Ursuline Convent.	Subjects XIV. and XXV.	F., L., M., B.-B., and Design.



## DAY EXAMINATIONS.

Centre Number.	Name of Centre.	Subjects in which Examinations were held.	
		Science.	Art.
	LEINSTER.		
	Co. CARLOW—		
6247	Bagenalstown: Presentation Convent.	Subjects XIV. and XXV.	F. and G.-D.
6260	Carlow: Convent of Mercy.	—	F., L., M., and G.-D.
6356	Tullow: Brigidine Convent.	—	F., L., M., and G.-D.
	Co. DUBLIN—		
6269	Blackrock: Dominican Convent, Slon-hill.	—	F., M., and G.-D.
6728	Rathgar: School.	—	F., M., G.-D. and P.
	Co. BOROUGH OF DUBLIN—		
6143	Dublin: Christian Brothers' Novitiate, Marino, Clontarf.	—	M. and G.-D.
	Co. KILKENNY—		
6458	Goresbridge: Brigidine Convent.	—	M. and G.-D.
	Co. LOUTH—		
6416	Drogheda: Municipal Technical School.	Subject V. (Divn. I.),	—
6120	Drogheda: Sienna Convent.	—	F., L., G.-D., and P.
	Co. MEATH—		
6568	Navan: Loreto Abbey.	—	F. and G.-D.
6666	Oldcastle School.	Subjects V. (Divn. I.) and XXIII.	—
	QUEEN'S COUNTY—		
6310	Abbeyleix: Brigidine Convent.	—	F., M., and G.-D.
6356	Mountrath: Brigidine Convent.	—	F., L., and M.
	Co. WESTMEATH—		
6536	Mullingar: Loreto Convent.	—	F.
	MUNSTER.		
	Co. CLARE—		
6105	Kilmihill: Cahirmurphy School.	Subjects V. (Divn. I.), and XXIV. (Divn. I.)	—
	Co. CORK—		
6569	Macroom: Convent of Mercy.	—	F. and L.
6556	Queenstown: Convent of Mercy.	—	L. and M.
	Co. BOROUGH OF CORK—		
6008	Crawford Municipal Technical Institute.	—	P.
6320	Presentation Brothers' Monastery, Mount St. Joseph.	—	F., L., M., and G.-D.

## DAY EXAMINATIONS.

Centre Number.	Name of Centre.	Subjects in which Examinations were held.	
		Science.	Art.
	CO. BOROUGH OF CORK— <i>con.</i>		
6320	St. Aloysius' School, St. Marie's of the Isle.	—	F. and L.
6024	St. Vincent's Convent, St. Mary's-road.	Subject V. (Divn. I.),	F., L., M., and G.-D.
	CO. KERRY—		
6015	Kenmare: Convent of Poor Clares.	—	F., M., and G.-D.
6048	Killarney: Loreto Convent, .	Subject XXV.,	F. and M.
6068	Trillick: Presentation Convent.	—!	F., L., and M.
	CO. TIPPERARY—		
6147	Cashel: Presentation Convent,	—	F., L., M., G.-D., and P.
6148	Thurles: Presentation Convent,	—	F., L., and G.-D.
	CO. WATERFORD—		
6070	Waterford: Municipal School of Art.	—	F., M., G.-D., and P.
	ULSTER.		
	CO. ANTRIM—		
6358	Ballymena: Municipal Technical School.	—	F., L., M., G.-D., and P.
6028	Lisburn: Convent of the Sacred Heart of Mary.	—	L.
	CO. DOWN—		
6544	Newry: Municipal Technical School.	Subjects X. and Xp. (Stage I.),	—
	CO. FERMANAGH—		
6372	Enniskillen: Convent of Mercy.	—	F., L., M., and G.-D.
	CO. LONDONDERRY—		
6549	Londonderry: Convent of Our Lady of Mercy.	—	F.
6037	Londonderry: Municipal Technical School.	—	G.-D.
	CO. TYRONE—		
6128	Cookstown: Ladies' School, .	—	G.-D.
	CONNAUGHT.		
	CO. GALWAY—		
6066	Galway: City of Galway Technical Institute.	Subjects I., V. (Divn. I.), VIII., IX. and XXIII.	F. and P.
6690	Tuam: Convent of Mercy, .	—	F.
6266	Tuam: Presentation Convent,	—	F. and G.-D.
	CO. MAYO—		
6202	Kiltimagh: St. Louis Convent,	—	F., L., M., and G.-D.

## NOTES AND MEMORANDA.

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There was a meeting of the Agricultural Board on Tuesday, 8th November, 1904, and a meeting of the Board of Technical Instruction on Wednesday, 9th November, 1904.

**Meetings of the  
Boards.**

The Consultative Committee of Education met on 7th November, 1904.

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The Department have established a station at Avondale, Rathdrum, County Wicklow, for the purpose of training a limited number of young men desirous of acquiring a practical knowledge of the breeding and fattening of poultry with a view to undertaking the management of Fattening Stations in other parts of the country. For full particulars see p. 328.

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A limited number of Scholarships and Teacherships-in-Training, tenable at the Royal College of Science, Dublin, will be offered for competition among Students of Science and Technology in 1905. The Scholarships are of the value of £50 per annum, and, in addition, entitle the holder to free instruction during the Associate Course, and third-class railway fare for one journey each session to and from Dublin.

**Science and Techno-  
logical Scholarships.**

A Teachership-in-Training entitles the holder to free instruction during the Associate Course, a maintenance allowance of 21s. per week for the session of about forty weeks each year, and third-class railway fare for one journey each session to and from Dublin. Full particulars will be found on p. 341.

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A limited number of Teacherships-in-Training, tenable at the Metropolitan School of Art, will be offered for competition at the beginning of the session 1905-6. The object of the Teacherships-in-Training is to encourage capable Art students to undertake such a course of training as will enable them to become Art Teachers. Full particulars will be found on p. 338.

**Teacherships-in-  
Training at the  
School of Art.**

The Department will award in July, 1905, not more than (a) ten Open Scholarships, and (b) ten Limited Scholarships, to assist Domestic Economy Students in undertaking the full course of instruction at the Irish Training School of Domestic Economy, Kildare Street, Dublin. Scholarships will entitle the holders to free admission to the full course of training in Domestic Economy subjects. The School is not residential, and no subsistence allowance is given.

The Scholarships will be awarded as the result of a competitive examination, partly written, partly *viva voce*, to be held in Dublin, Belfast, Cork, and Galway. Should a sufficient number of candidates present themselves, examinations will also be held at Londonderry, Sligo, Limerick, and Waterford.

Full particulars as to conditions, &c., appear on page 343.

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A scheme of Scholarships has, with the approval of the Department, become part of the system of Technical Instruction of many County and Urban Committees, and as the Department, at the request of the Committees, have from time to time undertaken the examination of the candidates, it has been considered advisable to state, for the information of Committees, the arrangements which the Department propose to make in 1905 for the conduct of such examinations and the issue of results. A memorandum dealing with the subject, has, therefore, been drafted and issued to local authorities. A reprint of it appears on p. 334.

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In order to provide qualified Manual Instructors in Woodwork, the Department, in June last, selected by competitive examination a number of candidates to undergo a course of training under competent instructors in the workshops of the City of Dublin Technical Schools, which were, by the kind permission of the Technical Education Committee, placed at the Department's service. With two exceptions, the candidates had all been cabinet-makers, carpenters, or joiners.

The course, involving over 1,000 hours' attendance, began on June 21st, and ended on the 21st December. The last three days were devoted to examinations conducted by Mr. J. C. Pearson, now of the Home Office, and lately Chief Manual Instructor under the Liverpool

School Board, and Messrs. W. Vickers Dixon and J. C. Smail, Inspectors of the Department. As the result of satisfactory attendance and progress, and of the marks obtained in the final examination, the following candidates have been recognised as qualified to give instruction in Manual Work in Wood :—Edward Archer, of Ballybrack, Co. Dublin ; James Auld, of Belfast ; James D. Donnelly, of Dublin ; John Gill, of Belfast ; Patrick Griffin, of Cork ; Timothy J. Hurley, of Tralee ; William B. Jamison, of Belfast ; James Lalor, of Dungarvan ; Alexander M'Kibbin, of Belfast ; James M'Nally, of Loughbrickland ; Denis A. Mulcahy, of Limerick ; John O'Reilly, of Tralee ; John Starkey, of Belfast ; Thomas W. W. Thornton, of Dublin ; William H. Todd, of Belfast.

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As the result of the recent competition held by the Department, Commercial Scholarships of the value of £100 each, tenable for one year, have been awarded to Messrs. D. J. Coakley, Cork ; W. B. Cooper, Castlegarren, County Sligo ; E. Daly, Dublin ; and W. Scott, Drogheda. These scholars are in training at the London School of Economics with a view to becoming teachers of commercial subjects in technical schools and classes in Ireland.

Industrial Scholarships, value £80 each, tenable for one year, have been awarded to Mr. P. Sheehan, Dungarvan (Woollen Industry), and Mr. P. Cullen, Ballytore, County Kildare (Leather Industry). Both these scholars are studying in the laboratories of the University of Leeds.

The Industrial Scholarships have been awarded to give young men, already engaged in industrial occupations, an opportunity of obtaining a knowledge of the most modern and scientific methods in connection with their own special work, with the object of bringing such improved knowledge to bear on existing industries in Ireland.

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An Order of the Board of Agriculture and Fisheries, dated 22nd November, has been issued, declaring that the landing in Great Britain of swine from Ireland will, after 23rd January, 1905, be restricted to swine for slaughter. Particulars of the necessary licences and of the requirements are contained in the Order, which may be obtained gratis and post free from the Board of Agriculture and Fisheries, 4, Whitehall Place, London, S.W., and from the Department of Agriculture and Technical Instruction for Ireland (Veterinary Branch), Castle Street, Dublin

**Swine Fever (Movement from Ireland) Order, 1904.**

The Annual Report (Cd. 2322-1904), dealing with the number and class of the Migratory Labourers, or "Harvest men" who leave Ireland for the English and Scotch harvest fields, has just been published.

**The Irish "Harvestmen."** In the year 1904, 17,859 labourers left the various ports of Ireland for the sister countries—692 going from Leinster, 514 from Munster, 2,950 from Ulster (2,364 or 80 per cent. of these latter came from Donegal), and 13,703 from Connaught. It will thus be seen that the problem is almost exclusively a western one; indeed, one western county—Mayo—contributed 9,527 migrants to the total, or more than 50 per cent. of the number for the whole country.

Of recent years the numbers have steadily declined, and the tendency is still to greater contraction. If this contraction were due to the class from which harvestmen come settling at home, or if it were due to such improvements in the position and prospects of the labourers as rendered them independent of cross-Channel employment, the decline would be proof of an economic gain. As it is, however, the diminution is due to the fact that great numbers of the people have left the country altogether. It might be urged, of course, that emigration would not account for the decline, since the fall in the number of the harvestmen is not only absolute but also relative, seven per cent. of the population being temporary migrants in 1841, and only four per cent. in 1904. It is to be remembered, however, that it is not from the population as a whole that the harvestmen come, but from a class, and that the class is the one from which the emigrants are drawn. Of course it is not suggested that emigration is the only cause of the decline. The actual migration in any series of years is the resultant of a number of circumstances, such as emigration, the decline of tillage in England and Scotland, the increased use of agricultural machinery, &c. Besides, too, the annual migration of harvestmen has become a settled feature of the economy of certain districts in the West.

As to the condition of these labourers, they are mainly the holders of small patches of land—generally a bit of bog which, by their own industry, they reclaimed from a state of unprofitable barrenness and waste. They usually sow their little crops of potatoes and oats, and then, having no prospect of employment at home, they take the harvestmen's ticket at the local railway and find their way to an English or Scotch farm homestead. There they work with energy and faithfulness, and are highly esteemed by their employers, so much so that many for twenty years have gone back to the same farmers.

The Annual Report (Cd. 2321-1904), issued by the Board of Agriculture and Fisheries, on the distribution of grants for agricultural education and research for the year 1903-4 has just been issued. It contains an account of the colleges and institutions aided and the experiments conducted, together with a summary of the agricultural instruction provided by County Councils in 1903-4, and a statement of the expenditure incurred on the same account in 1902-3. As a result of the financial support given by the Board to the National Fruit and Cider Institute, the general grants in aid of educational institutions for 1903-4, which amounted to £9,200, show an increase of £300 as compared with the previous year. The National Fruit and Cider Institute station for research and education in the production and utilisation of British fruit is the outcome of experiments conducted for some years by the Bath and West and Southern Counties Society. The station is now annually supported by a grant in aid from the Board.

The special grants for experiment and research, which amounted to £650, underwent some modification.

**Research.** The grant to the Bath and West Society for research into the origin and cause of flavour in dairy produce shows a diminution of £100, due to the fact that it was deemed advisable to suspend operations during the winter, when cheese-making is largely discontinued.

The reports of the Board's superintending inspector outline the courses of instruction given at the several institutions, and indicate the attendance at the various internal and external classes. The number of students in attendance at definite internal courses of instruction has considerably exceeded one thousand, while the figures for the external audiences are estimated at over twenty-two thousand.

The Board of Education have issued a return (House of Commons Paper, No. 280) showing the extent to which, and the manner in which, local authorities in England and Wales have applied funds to the purpose of technical education during the year 1902-3, under the Local Taxation (Customs and Excise) Act, 1890; the Technical Instruction Acts, 1889 and 1891; the

Welsh Intermediate Education Act, 1889; and the Public Libraries and Museums Acts.

The figures show that the total amount of the residue received under the Local Taxation (Customs and Excise) Act by the Councils of counties and county boroughs in England (excepting the County of Monmouth) in respect of the year indicated was £879,405 5s. 4d., of which £840,253 3s. 4d. was appropriated to educational purposes, and £39,152 2s. to relief of rates; the latter sum including £22,366 11s. 9d. devoted by the London County Council to relief of rates. The total amount expended on technical education in England during the year was £1,149,216.

As to Wales and Monmouth, the total amount of the residue paid to the thirteen County Councils and the Councils of the three county boroughs was £42,201. These local authorities were devoting the whole of it to intermediate and technical education, chiefly under the Welsh Intermediate Education Act, 1889.

In addition, the Councils of eight counties, three county boroughs, four boroughs, and eight urban districts were making grants out of the rates under the Technical Instruction Acts.

The total amount expended on technical education in Wales and Monmouth under the Technical Instruction Acts during the year was £42,781.

An interesting note on the subject of Foot Rot in Sheep appears in the report (Cd. 2321-1904) just issued, by

**Foot Rot in Sheep.** the Board of Agriculture and Fisheries, on Agricultural Education in England. At various times during recent years the Board's attention has been directed to the loss and inconvenience caused to flock-masters by foot rot in sheep. Careful treatment of the hoof has long been recognised as the surest way to effect a cure, but where a large number of animals have to be dressed much time and labour are involved and the due performance of the operation is apt to be neglected. Of recent years attention has been directed to the advantages of treatment by means of a foot-bath, into which a suitable solution is placed, and through which the sheep are walked. In order thoroughly to test this method of treatment, the Board obtained, at a cost of £57, thirty baths and a ton and half of copper sulphate (bluestone). These baths have been



placed on selected farms in various parts of Great Britain where the disease is prevalent. It is hoped that in this way definite information of service to sheep farmers may be obtained.

The total area returned as under crops and grass (excluding mountain and heath land used for grazing) in Great Britain in 1904 amounts to 32,317,610 acres as compared with 32,343,579 acres in 1903. This decline of 25,969 acres is largely attributable to the demand for land required for railway or building purposes, to which reference has been repeatedly made in the Annual Reports on the Agricultural Returns.

The broad changes in the distribution of the crops in 1903 and 1904 may be conveniently summarised in the following Table:—

Crop.	1904.	1903.	Increase or Decrease.	
			Total.	Per cent.
	Acrea.	Acrea.	Acrea.	
Cereal Crops, ... ..	6,953,034	7,060,543	— 107,509	— 1·52
Other Crops, ... ..	3,162,335	3,189,589	— 27,254	— 0·85
Clover and Rotation Grass, ...	4,671,495	4,807,826	— 136,331	— 2·84
Bare Fallow, ... ..	432,890	351,125	+ 81,564	+ 23·23
Total Arable, ... ..	15,219,554	15,409,084	— 189,530	— 1·23
Permanent Grass, ... ..	17,098,056	16,934,495	+ 163,561	+ 0·97
Total, ... ..	32,317,610	32,343,579	— 25,969	— 0·08

The decline in the arable land of Great Britain thus amounts to 189,530 acres. The cereal crops account for a decline of 107,509 acres, other crops of 27,254 acres, and clover and rotation grasses of 136,331 acres, while the surface left under bare fallow shows an increase of 81,564 acres which, following one of 57,995 acres in the previous year, brings the uncropped arable area back to practically the same figure as in 1896.

The decrease in the wheat area, amounting to 13 per cent., reduces the acreage under this cereal to 1,375,284 acres, which is the smallest area ever recorded. The lowest point to which the cultivation of wheat had been previously reduced was in 1895, when 1,417,483 acres were returned, but a recovery took place in

the three succeeding years until in 1898 the area reached 2,102,206 acres. Since then, except for a slight check in 1902, the wheat acreage has year by year declined, and the tendency in that direction was accelerated in 1904, as in 1903, by the unfavourable conditions prevalent in the preceding autumn for preparing the land and planting the crop. Whatever the causes, it must be considered noteworthy that one-third of the acreage returned as under wheat so recently as 1898 is now devoted to other crops.

Barley shows a decrease of 17,800 acres, making the area under this crop also the smallest on record. The decline occurs mostly in Scotland, and it is also heavier in Wales than in England, where it amounted to only 1,775 acres, or 0·1 per cent. In some counties the decline in barley is attributed to an unfavourable seeding time. In other counties this cereal largely took the place of wheat.

Oats exhibits an increase of 112,720 acres, or 3·6 per cent., thus raising the figures for this crop higher than in any previous year with the exceptions of 1894 and 1895. It may be noticed that this crop, which has long been the most widely-cultivated cereal in this country, now occupies for the first time in Great Britain an area larger than that under wheat and barley combined. Oats this year has to a considerable extent taken the place of wheat. In Scotland the increase is relatively slight, while in Wales there is an actual decline.

A fall of 3,350 acres brings the total area under rye down to 55,714 acres.

Potatoes occupy an area of 570,209 acres, or 5,923 more than in 1903. Turnips and Swedes show a small increase (of 803 acres, or 0·1 per cent.) for the first time since 1893.

**Root Crops.** The change is, however, very unevenly distributed; in England there is a net increase of 6,005 acres, but in Scotland there is a general decrease, amounting altogether to 5,203 acres. Mangolds, on the other hand, shew a small decline of 2,800 acres, or 0·7 per cent. These changes in the root crops may probably be ascribed mainly to the character of the weather during the spring.

Cabbage, Kohl-rabi, and Rape show a total decrease of 5,118 acres, or 2·8 per cent. The chief decline occurs in the relatively small amount of Kohl-rabi, the area of which fell from 19,297 acres in 1903 to 15,607 this year, or by 19·1 per cent. Vetches or Tares have also declined, the deficiency as compared with 1903 amounting to 16,737 acres, or 11·5 per cent.

Lucerne has been increasingly cultivated of late years, but on this occasion it shows a fall of 4,631 acres or 7·7 per cent. Among the remaining crops it may be mentioned that 10,847 acres were returned as under Carrots in Great Britain, 6,392 acres under Buckwheat, and 2,325 acres under Onions. The small area under Flax, three-fourths of which is grown in Yorkshire, has diminished by 362 acres, or 39 per cent., this decline being mainly accounted for by the reduction from 435 to 156 acres in the West Riding. A decrease of 139 acres under Hops is sufficient to make this year's area the smallest on record for that crop, which at one time occupied about 50 per cent. more than its present acreage.

The acreage under Small Fruit has shown a continual tendency to increase, and a further gain of 1,795 acres, or 2·4 per cent., is recorded this year, making the total of 77,947 acres the largest ever returned. Most counties show an increase, more particularly Middlesex, Norfolk, Worcester, Cambridge and Perth. Orchards also show an increase of 3,525 acres, or 1·5 per cent., of which over 1,000 acres are reported in Kent. The other principal orchard-bearing counties, Hereford, Devon, Somerset, Worcester and Gloucester, all return larger areas than in 1903.

A decline of 136,331 acres, or 2·8 per cent., appears in the area returned as under Clover and Rotation Grasses. The decrease is greatest in England and almost universal in Wales, but several Scotch counties show an increase, and the net decrease north of the Tweed is relatively small. Of the total area about half was mown for hay, but there is a greater relative decrease in the mown than in the grazed area.

Permanent Grass shows an increase of 163,561 acres, or 1 per cent.; and the total for Great Britain now exceeds 17,000,000 acres. The area mown for hay amounted to rather more than a quarter of the total, and showed a relatively small increase of 10,433 acres. In England, there was a decrease of 6,029 acres in the hay area, which was, however, more than counterbalanced by a rise of 15,646 acres in Wales, and a small increase in Scotland.

The whole area intended for hay, whether under rotation or in permanent grass, amounts to 7,088,298 acres, as compared with 7,167,415 acres in 1903, or a decline in the total hay area of 79,117 acres.

The total number of horses included in the Returns—viz.:

	horses used for agricultural purposes,
<b>Live Stock.</b>	mares kept for breeding, and unbroken
	horses—is the largest hitherto recorded,

surpassing by nearly 8,000 the number returned in 1896. The increase, as compared with 1903, amounts to 23,082, or 1·5 per cent. Proportionately, the increase is greatest among unbroken horses under one year, which may be taken as some indication of the progress of breeding. For the whole country the increase in this class amounted to 3·8 per cent., but it was relatively most marked in Wales, where it amounted to 7·4 per cent., as compared with 3·1 in England, and 2·5 in Scotland.

Except for the year 1892, when 6,944,783 were returned, the number of cattle in 1904 is the highest total ever shown in Great Britain, the increase over 1903 amounting to 153,734, or 2·3 per cent. In England and Wales there is a large increase. On the other hand, there is a not decline of 34,561 north of the Border. There is a noteworthy advance among the cows and heifers in milk or in calf, which now amount to 2,678,680, or 90,472 more than in 1903—a number never previously equalled. This increase occurred mainly in England, the increase in the dairy herds of Scotland being less conspicuous. Cattle under one year, and those under two years, both show an even higher rate of increase than the cows. The increase of the younger stock is, however, confined to England and Wales, Scotland recording a decline in both categories. In the older cattle, there is a general decrease of 55,989.

Sheep have continued the decline that has been a marked feature in live stock statistics for many years past. On this occasion the diminution amounts to 432,619 head, or 1·7 per cent. of the total in 1903. Lambs, especially in Scotland, have decreased, the lambing season having been unfavourable in many districts, while in some cases the reduction in numbers is ascribed to a greater proportion of early sales. Sheep of one year and above, other than breeding ewes, have also fallen off.

Pigs, of which the number fluctuates considerably from year to year, exhibit an increase of 175,083, or 6·5 per cent., which is generally distributed throughout the country. This is attributed in several countries to the reduction of swine fever.

In the recent report on agricultural mutual assurance societies in France, presented to the President of the French Republic by the Minister of Agriculture, and published in "Bulletin in France. *Mensuel de L'Office de Renseignements Agricoles*" for November, 1904, the writer points out that the functions of his Department are not only to develop the resources of the soil, but also to improve the general conditions of the rural population. The French Department, accordingly, whilst endeavouring by useful legislative measures and encouragement of every kind to increase the quantity and value of the produce of the land, to improve agricultural implements and encourage agricultural progress in every direction, has also taken upon itself the task of rendering less precarious the lot of the husbandman, exposed, as he is, to heavy losses, through no fault of his own, from cattle disease and unfavourable weather; and who, in consequence of this insecurity, is unable to obtain that credit which he needs just as much as the merchant or the manufacturer. Influenced by these ideas funds were voted and applied to the foundation of mutual credit societies with very satisfactory results. But besides this it was necessary by a more extended application of the principle of co-operation to secure the farmers as far as possible against the heavy losses of cattle and crops from disease and storm. It would be out of the question to make good all these losses out of State funds, as they amount annually to several hundreds of millions of francs. The French Department has, accordingly, tried to impress upon those interested that, although they have only themselves to depend upon, they can still find in the fruitful principles of co-operation a refuge from the insecurity incidental to their calling.

Up to 1898 no encouragement was given to agricultural mutual assurance societies, which at the end of 1897 numbered 1,484. Of this number 700 belonged to the single department of Landes where societies for mutual assurance against loss of cattle had existed for a long time, organised in a crude but efficient manner; about a third of the Departments (*i.e.*, departmental districts) had no society. The Government, in 1898, set aside a sum of half a million francs (£20,000) to help in the promotion of these mutual assurance societies amongst farmers. Out of this fund newly created societies were each given a sum of about five hundred francs (£20),

#### State Aid.

which enabled them to cover the initial foundation expenses—usually very small—and to put by a little reserve fund. The societies already in existence, which were in financial difficulties in consequence of exceptional losses, received grants in proportion to their losses and to the amount paid by the members on their shares. Legal difficulties at first threatened the success of the new movement, and, until a law was passed in July, 1900, removing these, progress was slow; but since that date the number of these societies has rapidly increased. The number of new societies created were—in 1898, 110; in 1899, 341; in 1900, 349; in 1901, 390; in 1902, 469; in 1903, 737; in 1904 (31st Oct.), 940; making in all a total of 3,336 societies founded since the 1st of January, 1898. The total number in existence on the 31st October last was, accordingly, 4,820, which together insured a capital of over 250 million francs (£10,000,000) and included 265,015 members. These societies were divided as follows:—Cattle mortality, 4,702; cattle re-insurance, 17; hail, 16; fire, 83; accidents, 2.

On the 31st December, 1897,, twenty-seven departments had no society, and only two had more than one hundred; on the 31st October, 1904, only one department had no society and thirteen had more than one hundred. The number of members, however, has not increased as rapidly as the number of societies. This is due to the fact that the great majority of the latter are cattle societies, each having but a small membership and confined to a restricted area. It has been found that the local grouping is best suited to these societies, as each member knows every other, and is more easily able to watch after his own interest. The other insurance societies mentioned above require, in consequence of the nature of the risk involved, a more extended sphere of action and a larger membership. In those districts where the small cattle societies are numerous enough they are induced to combine, and by small subscriptions to create a fund for re-insurance, thus making their position more secure. This system of re-insurance already exists in a number of the departments.

### **An Example of German Enterprise.**

The *Board of Trade Journal* gives an interesting account, based on a Foreign Office despatch, of the methods pursued by some German manufacturers and exporters in building up a business in foreign countries.

It appears that German firms, either singly, or several firms combined, choose some young man in their employment whom they consider suitable, and send him out to the country in which they wish to secure business. This man receives a salary for the first few years, as well as a share in any profits that may be made ; but in addition to this he is allowed to draw on them at his discretion for a considerable sum of money.

His instructions are to settle himself modestly in the principal town, with the avowed intention of setting up a little general business for himself ; if possible, he is to obtain regular employment until he is able to do so. He is then to give orders to the regular commercial travellers of all nations who frequent the place, for small quantities of the goods they usually supply there. In a year's time he is probably in a position to know what class of each kind of goods sell best, and the reasons for the preference. He has also noticed what improvements could be made, as well as all the details concerning packing, weight, colour, quality, size, &c., that play so important a part in the sale of goods in foreign countries. During all this time he is constantly sending home to his employers samples of these goods, and explanations how to make them still more suitable to the market.

In the first year the little store probably pays its way, and in two or three years it is not only making a profit, but a quantity of really trustworthy information has been obtained concerning the goods in general use in the country.

During this time the goods are being produced at home, with the improvements recommended, so that the home firms are in a position to compete with any foreigners. Their representative then establishes its branches in other towns, and the extension of the business simply depends on the capabilities and good fortune of the man employed.

Men sent abroad under these conditions have a real incentive to work, as instead of being simply employés, they are working for themselves from the first, with the prospect of gaining a good and independent position.

A further advantage in this system is that even if the man starts an independent business as soon as he is able, as so many Germans do, the connection still remains, and the knowledge gained, even in a few years, of the actual requirements of the country is worth the money expended.

In the case of the complete failure of the man sent out, the loss need not be a serious one, if divided among several firms who have allowed a credit of a few hundred pounds each.

The great importance of the toy industry to Germany may be gathered from the following facts, which are taken from a report made by H.M. Consul at Hamburg:—

Toys form one of the most important branches of German industry exported from Hamburg. In 1903 German Toy Industry, the total volume of the same shipped from that port was 17,300 tons, valued at £1,207,630; and of this 7,264 tons, valued at £431,625, were exported to the United Kingdom. The total exports of toys from Germany during that year was valued at £2,786,274, of which the United Kingdom received an amount valued at £950,987. The principal manufacturing centres are at Nuremburg and Furth in Bavaria, Sonneberg and some other parts of Thuringia, and the Saxon "Erzgebirge." There are more than 200 toy factories in Nuremburg and Furth, and of these 150 make exclusively metal toys, the only part worked by hand being the final painting. In this respect the toy industry of the two Bavarian towns is different from that in all other parts of Germany, where it is almost exclusively carried on by manual labour, that is to say, by workmen and women in their own homes. Nuremburg has 44 and Furth 8 establishments for manufacturing toys other than metal—of wood, bone, &c.; and 23 factories for the manufacture of paper and pasteboard toys. The most ordinary kind of the Nuremburg wooden toys (which sometimes do not fetch more than 1d. per dozen) are made by hand in the Bavarian highlands and the Rhoen mountain district, where the material and wages are extremely low. The toy industry of Sonneberg and the surrounding district owes its existence more especially to the large Thuringian forests.

The United States Consul-General at Barcelona states that the provincial Council of Agriculture, Industry, and Commerce at Santander has petitioned the Government to apply to the cultivation of flax the same official support recently

**Flax Cultivation  
in Spain.**



offered to cotton-growing in Spain. At Santander a flax-spinning mill has been erected, and it is hoped that before long it may be able to obtain its entire supply of raw flax from local sources, provided the cultivation be extended under Government subvention as in France, where the cultivation of flax and hemp is assisted by a State grant of £100,000.

The Government of Argentina have formulated a system of inspection of the butter manufactured in that country and of all buildings where it is manufactured or sold. No butter may in future be exported from the country unless a certificate as to its quality has been furnished by the proper authority.

The Board of Trade Journal of November 10th states that a despatch has been received from H.M. Consul at Buenos Ayres reporting that a Buenos Ayres firm of importers and dealers in selected grain for seed and other purposes have asked for the names and addresses of British firms producing and dealing in oats for fine stock, with the object of opening up business relations. Communications should be addressed to H.B.M. Consul, British Consulate, Buenos Ayres.

The following Order-in-Council was issued in June last by the Queensland Government:—

Horses or cattle shall not be imported into Queensland from any country outside the Commonwealth of Australia and New Zealand unless, immediately before leaving the place of shipment, they shall have been subjected by a duly-qualified veterinary surgeon to the Mallein test for glanders in the case of horses, and the tuberculin test for tuberculosis in that of cattle, and a certificate of the veterinary surgeon that they have been subjected to the

requisite test, and are free from disease or infection, shall be produced before the landing of such stock shall be permitted.

Under another regulation of the same date horses and cattle imported into Queensland from a foreign country may, after their arrival and before they are released from quarantine, be subject to the above tests, if in the opinion of the Chief Inspector of Stock the test is necessary, notwithstanding that they may have been subjected to such test immediately before leaving the place of shipment.

One hundred and four creameries participated in the Surprise Butter Competitions \* conducted by the Surprise Butter Department in 1904. Five competitions were held during the year, particulars of which are set forth in the following table :—

Telegrams Issued.	Exhibits Judged.	Number of Entries.	Number of Prizes awarded.	
			First Class.	Second Class.
19th May, 1904, .	26th May, 1904, .	99	5	8
15th June, 1904, .	22nd June, 1904, .	104	6	9
30th June, 1904, .	7th July, 1904, .	101	7	11
17th August, 1904, .	24th August, 1904, .	100	5	14
14th September, 1904, .	22nd September, 1904, .	99	5	7

The following creameries obtained prizes at three of the competitions :—Finn Valley C. A. and D. S.; Granagh C. D. S.; Kiltoghert C. A. and D. S.; Piltown C. A. and D. S.; Scottish C. W. S.; and Solohead C. A. and D. S.

The following obtained prizes at two of the competitions :—Anglo-Irish Condensed Milk Co., Ltd.; Belleek C. A. and D. S.; Derrygonnelly C. D. S.; Doons C. A. and D. S.; Dromore C. A. and D. S.; Drumquin Creamery; Effin C. A. and D. S.; Five-miletown and Brookeboro' C. A. and D. S.; Grantstown C. W. S.; Kilmallock Creamery Co.; Knockvicar C. A. and D. S.; Leckpatrick C. A. and D. S.; North Cappagh C. A. and D. S.; Old Mill Creamery (North Kerry Creamery Co.); Omagh C. A. and D. S.; Springfield C. A. and D. S.; Urney C. A. and D. S.

The following obtained a prize at one of the competitions :—Aghadowey C. D. S.; Ardagh C. D. S.; Ballinahinch C. W. S.;

\* S *Journal*, Vol. III., No. 3, pp. 563, et seq.

Ballinamore C. A. and D. S.; Ballymacelligot C. D. S.; Ballyrashane C. A. and D. S.; Boherbue C. W. S.; Cavan Creameries Co.; Cutteen C. W. S.; Donegal C. A. and D. S.; Dromclough C. W. S.; Drumbane C. A. and D. S.; Grangemockler C. D. S.; Greenane C. W. S.; Howardstown Dairy Co.; Inver C. A. and D. S.; Kilfinane C. D. S.; Killyman C. A. and D. S.; Limavady C. A. and D. S.; Longford C. A. and D. S.; Moneymore C. A. and D. S.; Muckalee C. D. S.; Newcastle West C. A. and D. S.; Sarsfield C. D. S.; Whitecross C. A. and D. S.

In addition to the prizes given at each competition, a sum of £20 was awarded in the form of special prizes to the three under-mentioned competitors, whose exhibits obtained the highest number of points during the season:—

—	Marks obtained. Max. 2,100.	Percentage of Max.	Special Prize Awarded.
Finn Valley C. A. and D. S., .	1903	90·6	£8
Granagh C. D. S., .	1903	90·6	£8
Solohead C. A. and D. S., .	1894	90·2	£4

The following creameries scored 90 per cent. of the maximum marks obtainable at the five competitions:—

—	Marks obtained. Max. 2,100.	Percentage of Max.
Scottish C. W. S. (Enniskillen), . . .	1892	90·10
Doons C. A. and D. S., . . .	1890	90·00
Longford C. A. and D. S., . . .	1890	90·00

The Judges at the competitions included representatives of the principal buyers of Irish butter in Great Britain, as well as of Cork, Limerick, and Belfast. Not less than four Judges, representing different markets, acted at each competition. A high standard, based on the quality of the best butter sold in the markets of Ireland and Great Britain, was adopted in judging.

Comparing the butter exhibited at the Competitions held in July and August last with the exhibits at the Competitions held in the same months last year, the Reports of those of the Judges who had experience of the Competitions in both years express the opinion that this year's exhibits were very

creditable, and compared favourably with those of last year. The butter exhibited at the Competitions held in May, June, and September was of good average quality, but it could not be said that the standard reached was one with which Creamery managers should rest satisfied. The Judges were unanimous in stating that improvement is desirable in the matter of texture; a very large number of samples at each Competition had not the firm waxy texture which the public taste now demands. The soft, spongy texture of butter from which a quantity of loose moisture flows when bored by the butter-iron, is calculated to give the impression that it contains an excessive amount of water. This prejudices the purchaser against such butter, however pleasing it otherwise may be. It should also be remembered that a close-grained butter is usually superior in keeping qualities.

The Department are informed that, in some cases, consignments direct from Irish creameries have this year **Moulds on Butter.** been received by merchants with signs of mould \* apparent on the butter, and that, in other cases, consignments have developed mould very shortly after arrival. This is a defect from which Irish butter has hitherto been exceptionally free, and the Department desire to point out to creamery managers that every precaution should be taken to retain their good reputation in this respect. Strict cleanliness in the dairy and care in the preparation of the packages do much to prevent the development of mould. It is stated that a tendency has been noticeable among creamery managers to utilise the small cold stores now attached to creameries, for the purpose of "holding over" butter, hoping for a rise in the markets. This practice should be strongly condemned. An important advantage possessed by Irish creameries over foreign competitors is the ease with which freshly-made Irish butter can be placed on the British markets before it has lost any of its freshness and delicacy of flavour. The practice of storing butter means the loss of this advantage, and if continued will eventually lower the reputation of Irish creamery butter as a whole, and, consequently, be most injurious to the interests of the industry. The use of cold storage by merchants must not be considered as an excuse for extending the practice to the creameries. Besides, the small cold stores at creameries are totally unsuited

\* See article on the subject of "moulds on butter" at p. 320.

for retaining butter for any lengthened period, while those utilised by merchants are specially fitted for the purpose. In view of the increasingly large quantities of butter of second-rate quality which now reach the British markets, every advantage must be availed of to make the quality of the produce of Irish creameries second to none, as by this means only can a secure position in the markets be attained.

The Judges report a considerable improvement in regard to the packages and parchment papers used this year, as compared with those exhibited at the competitions held in 1903. At the same time, the use of unseasonable wood, short and unsuitable nails, and badly-made packages is still met with in some cases, resulting in injury to the samples in transit. Early in the year each competitor was supplied with samples of parchment paper which the Department considered to be of suitable quality; and it is hoped that creamery managers will endeavour in future to obtain parchment papers not inferior in quality to these samples.

## STATISTICAL TABLES.

## FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned  
compared with the

	North Coast.				East Coast.			
	1904.		1903.		1904.		1903.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	.	.	17	87	21	88
Sole, . . . . .	20	103	11	40	120	504	46	250
Turbot, . . . . .	.	.	.	.	19	114	23	108
Total Prime Fish, . . .	20	103	11	40	156	705	90	396
Cod, . . . . .	.	.	94	42	620	466	530	353
Conger Eel, . . . . .	.	.	.	.	628	454	403	232
Haddock, . . . . .	74	16	21	9	537	479	304	292
Hake, . . . . .	.	.	.	.	697	527	854	662
Herrings, . . . . .	290	104	28	13	13,993	5,500	27,844	9,398
Ling, . . . . .	.	.	.	.	177	83	279	118
Mackerel, . . . . .	199	46	26	7	2,898	856	560	148
Plaice, . . . . .	1,034	649	236	309	880	872	586	623
Ray or Skate, . . . . .	4	2	.	.	979	189	838	108
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	.	.	.	.	640	380	423	290
All other except Shell Fish,	229	85	128	61	1,954	822	2,327	554
Total, . . . . .	1,850	1,006	544	480	24,157	11,333	36,028	13,239
SHELL FISH :—	No.		No.		No.		No.	
Crabs, . . . . .	13,258	29	9,045	18	22,760	114	30,422	207
Lobsters, . . . . .	19,847	494	11,161	171	15,907	579	24,058	1,008
Mussels, . . . . .	Cwts.		Cwts.		Cwts.		Cwts.	
	.	.	1,800	30	178	16	427	20
Oysters, . . . . .	No.		No.		No.		No.	
	.	.	.	.	.	.	.	.
Other Shell Fish, . . .	Cwts.		Cwts.		Cwts.		Cwts.	
	8	2	.	.	530	183	499	140
Total, . . . . .	.	595	.	219	.	891	.	1,375
Total Value of Fish landed, .	.	1,590	.	699	.	12,224	.	14,614

NOTE—The above figures are subject to

## IRELAND.

as landed on the IRISH COASTS during the month of August, 1904, as corresponding period in 1903.

South Coast.				West Coast.				Total.			
1904.		1903.		1904.		1903.		1904.		1903.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
5	5	.	.	34	58	26	40	56	150	47	78
64	255	28	132	119	468	112	326	353	1,328	197	748
5	15	3	11	52	184	61	207	76	318	87	336
74	275	31	113	235	708	199	573	485	1,791	331	1,152
3	1	3	4	.	.	.	.	623	467	627	399
32	12	6	3	9	4	4	2	667	470	503	237
.	.	.	.	83	54	42	25	694	549	367	325
371	219	2,058	1,106	328	152	141	75	1,396	898	3,053	1,843
605	209	1,608	403	1,529	619	588	269	16,317	6,432	30,066	10,143
.	.	1	1	.	.	2	1	177	83	282	120
5,930	1,226	5,215	1,594	6,096	1,409	3,733	1,252	15,723	3,637	9,534	3,001
277	261	110	148	460	343	448	366	2,551	2,125	1,380	1,446
.	.	19	6	89	8	8	1	1,022	199	865	172
709	137	1,177	178	.	.	.	.	709	137	1,177	178
372	192	182	79	214	74	552	138	1,226	646	1,157	516
1,493	509	3,582	687	1,256	421	1,050	422	4,932	1,837	6,987	1,723
8,766	3,041	13,992	4,412	10,849	3,792	6,765	3,124	46,632	19,171	56,329	21,255
No.		No.		No.		No.		No.		No.	
2,001	16	1,035	7	689	5	320	3	45,628	163	40,832	235
11,249	320	7,326	214	24,414	835	7,441	202	71,317	2,238	49,986	1,596
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
.	.	.	.	31	3	.	.	209	18	2,227	50
No.		No.		No.		No.		No.		No.	
.	.	.	.	.	.	.	.	.	.	.	.
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
170	17	150	15	369	74	650	122	1,077	276	1,299	277
.	352	.	236	.	917	.	327	.	2,685	.	2,157
.	3,393	.	4,648	.	4,709	.	3,451	.	21,856	.	23,412

correction in the Annual Returns.



## FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast.				East Coast.			
	1904.		1903.		1904.		1903.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	.	.	21	99	23	72
Soles, . . . . .	7	24	17	95	154	559	181	584
Turbot, . . . . .	.	.	7	19	14	78	13	80
Total Prime Fish, . . . . .	7	24	24	114	189	736	197	736
Cod, . . . . .	28	10	.	.	748	608	554	536
Conger Eel, . . . . .	19	14	2	1	735	374	678	313
Haddock, . . . . .	138	45	54	43	808	818	339	361
Hake, . . . . .	.	.	.	.	607	610	1,014	331
Herrings, . . . . .	2,261	891	461	258	6,747	2,352	4,002	1,068
Ling, . . . . .	.	.	.	.	163	84	181	97
Mackerel, . . . . .	64	10	.	.	1,442	332	332	123
Plaice, . . . . .	757	506	427	335	994	1,097	783	744
Ray or Skate, . . . . .	51	15	62	19	897	175	817	300
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	10	5	17	3	610	396	483	350
All other except Shell Fish, . . . . .	233	63	324	161	1,756	822	2,207	818
Total, . . . . .	3,568	1,588	1,371	934	15,691	8,404	12,187	6,809
SHELL FISH :—	No.		No.		No.		No.	
Crabs, . . . . .	6,493	15	3,654	16	13,524	54	4,996	27
Lobsters, . . . . .	8,796	274	4,352	134	4,753	197	5,308	244
Mussels, . . . . .	Cwts.		Cwts.		Cwts.		Cwts.	
	.	.	.	.	214	25	615	30
Oysters, . . . . .	No.		No.		No.		No.	
	.	.	.	.	5,100	11	.	.
Other Shell Fish, . . . . .	Cwts.		Cwts.		Cwts.		Cwts.	
	12	2	8	2	400	166	360	125
Total, . . . . .	.	291	.	152	.	463	.	426
Total Value of Fish landed, . . . . .	.	1,879	.	1,086	.	8,857	.	7,355

NOTE.—The above figures are subject to

## IRELAND.

as landed on the IRISH COASTS during the month of September, 1904, as corresponding period in 1903.

South Coast.				West Coast.				Total.			
1904.		1903.		1904.		1903.		1904.		1903.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
.	.	.	.	23	36	31	45	44	135	54	117
37	176	24	115	90	273	86	232	288	1,032	288	1,026
4	15	2	8	39	160	43	166	57	253	65	263
41	191	26	123	152	469	160	433	389	1,420	407	1,406
.	.	1	1	9	6	.	.	785	624	555	539
.	.	6	2	7	3	12	4	761	391	693	350
1	1	.	.	35	30	24	19	977	894	417	423
2,619	1,023	1,152	542	440	185	287	116	3,672	1,818	2,453	1,489
960	369	1,951	779	2,847	973	4,900	2,081	12,835	4,606	11,914	4,786
.	.	.	.	.	.	5	1	163	84	186	98
52,862	12,935	19,235	6,043	46,190	12,181	17,131	7,892	100,498	25,468	36,696	14,058
158	187	90	112	170	157	419	331	2,079	1,947	1,719	1,522
.	.	.	.	9	2	9	2	957	192	888	221
173	27	2,796	237	.	.	.	.	173	27	2,796	237
188	84	135	56	486	123	697	226	1,294	613	1,332	635
866	269	340	109	871	400	405	195	3,726	1,559	3,276	1,283
57,888	16,106	25,732	8,004	51,162	14,534	24,019	11,300	128,309	39,632	63,339	27,047
No.		No.		No.		No.		No.		No.	
286	2	145	1	994	8	.	.	21,299	79	8,795	44
2,652	81	2,030	72	3,647	106	2,510	65	19,748	657	14,500	515
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
.	.	.	.	270	24	200	15	484	49	815	35
No.		No.		No.		No.		No.		No.	
.	.	200	1	.	.	.	.	5,100	11	200	1
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
370	46	339	50	625	110	793	144	1,407	324	1,500	331
.	129	.	124	.	247	.	224	.	1,120	.	926
.	15,235	.	8,126	.	14,781	.	11,524	.	40,762	.	27,973

correction in the Annual Returns.

## FISHERY STATISTICS

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as compared with the

	North Coast.				East Coast.			
	1904.		1903.		1904.		1903.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	.	.	8	11	14	41
Sole, . . . . .	5	18	14	65	115	438	57	392
Turbot, . . . . .	1	2	6	15	25	161	23	144
Total Prime Fish, . . . . .	6	20	20	80	148	610	94	577
Cod, . . . . .	203	92	3	3	515	445	710	633
Conger Eel, . . . . .	9	5	23	20	790	360	712	387
Haddock, . . . . .	438	191	52	42	938	1,068	460	529
Hake, . . . . .	.	.	.	.	419	415	592	626
Herrings, . . . . .	491	159	214	129	5,769	2,022	6,474	2,555
Ling, . . . . .	.	.	.	.	102	55	88	44
Mackerel, . . . . .	7	1	.	.	1,175	244	42	7
Plaice, . . . . .	167	147	295	250	1,437	1,263	1,309	1,369
Ray or Skate, . . . . .	10	1	43	13	1,100	198	672	194
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	.	.	7	1	679	446	721	433
All other except Shell Fish, . . . . .	318	89	698	309	1,929	1,022	2,503	965
Total, . . . . .	1,649	705	1,355	847	15,101	8,178	14,377	8,319
SHELL FISH:	No.		No.		No.		No.	
Crabs, . . . . .	2,824	6	299	2	2,348	14	2,458	18
Lobsters, . . . . .	1,640	40	1,483	46	1,953	83	3,243	152
Mussels, . . . . .	Cwt.	.	Cwts.	.	Cwts. 871	115	Cwts. 694	36
Oysters, . . . . .	No.	.	No.	.	No. 3,100	5	No.	.
Other Shell Fish, . . . . .	Cwt.	.	Cwts.	.	Cwts. 327	154	Cwts. 241	111
Total, . . . . .	.	46	.	48	.	371	.	317
Total Value of Fish landed, . . . . .	.	751	.	895	.	8,549	.	8,386

NOTE—The above figures are subject to

## IRELAND.

landed on the IRISH COASTS during the Month of October, 1904, as corresponding period in 1903.

South Coast.				West Coast.				Total.			
1904.		1903.		1904.		1903.		1904.		1903.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Owts.	£	Owts.	£	Owts.	£	Owts.	£	Owts.	£	Owts.	£
.	.	.	.	33	23	5	8	41	34	19	49
58	277	29	125	63	205	54	162	241	938	154	744
4	15	3	13	11	46	25	126	41	224	57	298
62	222	32	138	107	374	84	296	333	1,196	230	1,091
4	5	17	16	1	1	13	18	723	543	743	670
4	3	.	.	8	3	11	4	811	371	746	411
2	1	.	.	72	43	68	62	1,450	1,333	580	633
862	642	1,421	693	173	70	968	462	1,454	1,127	2,981	1,781
1,428	568	1,392	524	9,405	2,890	7,150	2,661	17,093	5,629	15,230	5,869
3	3	.	.	.	.	5	2	105	58	93	46
37,516	6,893	29,551	11,477	38,358	8,568	12,126	7,472	77,056	15,706	41,719	18,936
278	263	169	189	133	97	199	159	2,014	1,770	1,972	1,967
10	1	4	2	.	.	.	.	1,120	200	719	209
467	100	871	137	.	.	.	.	467	100	871	137
348	166	110	41	366	116	1,032	333	1,393	728	1,870	808
205	89	127	72	676	332	163	97	3,128	1,532	3,491	1,443
41,189	9,024	33,694	13,389	49,298	12,384	21,819	11,566	107,137	30,393	71,245	34,021
No.	.	No.	.	No.	.	No.	.	No.	.	No.	.
.	.	.	.	.	.	.	.	5,172	20	2,757	20
642	25	30	1	1,193	38	1,153	33	5,428	186	5,909	232
Owts.	.	Owts.	.	Owts.	274	Owts.	80	Owts.	1,145	Owts.	784
.	.	.	.	.	37	.	8	.	142	.	44
No.	1	No.	3	No.	.	No.	.	No.	6	No.	3
Owts.	405	Owts.	403	Owts.	940	Owts.	782	Owts.	1,672	Owts.	1,426
.	.	.	.	.	.	.	.	.	.	.	.
.	84	.	52	.	239	.	205	.	740	.	622
.	9,110	.	13,341	.	12,623	.	11,771	.	31,033	.	34,643

correction in the Annual Returns.

## FISHERY STATISTICS--

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as compared with the

	North Coast.				East Coast.			
	1904.		1903		1904.		1903.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	.	.	17	95	14	50
Soles, . . . . .	3	7	2	6	83	361	59	299
Turbot, . . . . .	1	1	.	.	23	128	21	99
Total Prime Fish, . . . . .	4	8	2	6	123	584	94	448
Cod, . . . . .	277	123	7	7	839	556	901	708
Conger Eel, . . . . .	19	14	3	2	671	296	593	303
Haddock, . . . . .	857	295	35	14	263	278	425	530
Hake, . . . . .	.	.	.	.	211	400	443	515
Herrings, . . . . .	12,834	3,311	4,389	1,468	7,333	2,569	24,501	5,526
Ling, . . . . .	.	.	.	.	227	130	68	96
Mackerel, . . . . .	2	1	.	.	6	4	.	.
Plaice, . . . . .	99	85	40	38	1,070	1,283	681	843
Ray or Skate, . . . . .	46	10	23	8	704	132	591	149
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	.	.	.	.	708	422	1,210	556
All other except Shell Fish, . . . . .	270	65	718	281	2,811	1,570	2,065	859
Total, . . . . .	14,408	3,913	5,217	1,824	14,966	8,224	31,572	10,473
SHELL FISH :	No.		No.		No.		No.	
Crabs, . . . . .	.	.	.	.	240	1	312	2
Lobsters, . . . . .	50	3	427	19	1,202	56	1,300	56
Mussels, . . . . .	Cwts.	.	Cwts.	.	Cwts.	36	Cwts.	19
Oysters, . . . . .	No.	.	No.	.	No.	5	No.	.
Other Shell Fish, . . . . .	Cwts.	.	Cwts.	8	Cwts.	79	Cwts.	130
Total, . . . . .	.	3	.	21	.	177	.	207
Total Value of Fish landed, . . . . .	.	3,916	.	1,845	.	8,401	.	10,680

The October . . . . . for Downings Bay (North Coast) not having been received in time for  
NOTE—The above figures are subject  
of 4 cwts. of haddock, 56 cwts.

## IRELAND.

landed on the IRISH COASTS during the month of November, 1904, as corresponding period in 1903.

South Coast.				West Coast.				Total.			
1904.		1903.		1904.		1903.		1904.		1903.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
1	4	.	.	.	.	2	8	18	99	16	58
65	256	35	153	40	111	75	215	191	735	171	673
10	36	4	13	12	61	18	93	46	228	43	205
76	296	39	166	52	172	95	316	255	1,060	230	936
27	29	44	54	31	9	87	34	1,174	717	1,039	803
13	2	6	1	23	6	47	20	726	318	648	326
9	6	1	1	315	137	168	85	1,444	716	629	630
347	293	804	328	121	48	86	33	679	741	1,333	876
798	208	758	437	5,444	1,469	5,496	1,655	26,409	7,615	35,144	9,096
.	.	.	.	33	14	8	3	260	144	76	39
3,909	837	10,554	5,580	17,877	5,694	10,567	6,029	21,854	6,536	21,121	11,009
381	382	362	328	116	89	138	127	1,666	1,840	1,221	1,336
3	1	.	.	18	5	13	6	771	148	627	163
81	26	2,666	297	.	.	.	.	81	26	2,666	297
725	293	184	71	209	97	862	336	1,642	812	2,256	963
143	72	247	137	414	184	275	145	3,638	1,891	3,305	1,422
6,572	2,503	15,661	7,400	24,653	7,924	17,842	8,789	60,599	22,564	70,296	28,486
No.	.	No.	.	No.	.	No.	.	No.	1	No.	2
.	.	165	8	911	27	1,326	49	2,163	86	3,218	132
Cwts. 29	7	Cwts.	.	Cwts. 110	12	Cwts. 30	4	Cwts. 646	55	Cwts. 545	23
No. 831	12	No. 4	2	No. 114,098	133	No. 181,892	136	No. 119,213	150	No. 181,896	138
Cwts. 345	53	Cwts. 177	44	Cwts. 780	154	Cwts. 625	125	Cwts. 1,300	286	Cwts. 1,084	301
.	72	.	54	.	326	.	314	.	578	.	596
.	2,575	.	7,464	.	8,250	.	9,103	.	23,142	.	29,082

to correction in Annual Returns. Inclusion in the October statement, has been included in the statement for November. It consisted of herrings, and 1 cwt. of plaice.

STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Eleven Months ended 30th November, 1904, compared with the corresponding Periods of the Year 1903.

	November.		Eleven Months ended 30th November.	
	1904.	1903.	1904.	1903.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Brill, ... ..	2,228	2,895	24,924	26,641
Soles, ... ..	7,395	6,258	66,334	61,293
Turbot, ... ..	5,730	5,618	61,540	56,968
Other Prime Fish, ... ..	543	544	3,230	4,685
Total Prime Fish, ... ..	15,896	15,815	156,028	149,635
Catfish, ... ..	642	1,208	42,498	33,383
Cod, ... ..	74,303	77,574	1,123,122	1,140,501
Conger Eels, ... ..	7,985	5,840	48,172	39,608
Dabs, ... ..	9,167	12,120	103,526	105,486
Gurnards, ... ..	6,889	5,662	83,733	77,569
Haddock, ... ..	177,548	204,731	2,205,273	2,328,009
Hake, ... ..	19,815	25,392	387,754	376,114
Halibut, ... ..	5,813	5,472	125,669	105,257
Lemon Soles, ... ..	3,088	3,239	38,776	39,645
Ling, ... ..	11,747	10,087	169,716	130,907
Megrims, ... ..	7,372	5,443	68,013	45,999
Monks (or Anglers), ... ..	3,079	3,746	31,857	31,444
Plaice, ... ..	115,599	65,810	818,141	844,602
Skates and Rays, ... ..	31,460	28,012	317,630	299,069
Torsk, ... ..	1,001	1,587	8,989	9,827
Whiting, ... ..	28,651	18,242	232,072	205,131
Witches, ... ..	4,520	2,632	33,328	35,720
Mackerel, ... ..	3,168	6,370	518,804	347,903
Herrings, ... ..	952,119	1,077,940	2,800,291	2,700,787
Pilchards, ... ..	34,561	4,041	175,325	70,789
Sprats, ... ..	17,007	9,130	55,103	44,477
Fish, all other, except Shell Fish, ... ..	38,431	32,041	412,092	378,282
Total, ... ..	1,569,654	1,621,634	9,935,812	9,540,144
Shell Fish:—	No.	No.	No.	No.
Crabs, ... ..	103,853	84,324	5,014,275	4,873,175
Lobsters, ... ..	7,661	6,210	546,001	546,354
Oysters, ... ..	3,500,800	3,253,000	30,600,800	22,848,000
Other Shell Fish, ... ..	45,556	37,260	367,418	321,656

NOTE.—The figures for 1904 are subject to correction in the Annual Returns.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Eleven Months ended 30th November, 1904, compared with the corresponding Periods of the Year 1903.

	November.		Eleven Months ended 30th November.	
	1904.	1903.	1904.	1903.
	VALUE.			
	£	£	£	£
Brill, ... ..	5,893	6,641	64,210	66,149
Soles, ... ..	38,543	34,791	394,497	404,342
Turbot, ... ..	21,570	20,212	226,551	216,076
Other Prime Fish, ... ..	865	826	4,688	8,235
Total Prime Fish, ...	66,871	62,470	689,946	694,979
Catfish, ... ..	291	912	11,824	13,195
Cod, ... ..	55,122	60,749	647,242	671,840
Conger Eels, ... ..	5,558	4,013	34,858	31,675
Dabs, ... ..	5,923	7,656	71,960	61,945
Gurnards, ... ..	2,104	1,883	25,829	25,038
Haddock, ... ..	116,794	114,108	1,157,075	1,145,942
Hake, ... ..	13,647	19,959	233,733	248,479
Halibut, ... ..	15,268	13,863	226,812	214,716
Lemon Soles, ... ..	7,473	7,913	82,992	90,686
Ling, ... ..	7,550	6,931	84,369	75,242
Megrims, ... ..	3,667	3,637	32,944	26,719
Monks (or Anglers), ... ..	967	1,395	10,244	11,745
Plaice, ... ..	81,883	63,198	734,781	781,660
Skates and Rays, ... ..	16,992	15,631	163,187	150,998
Torsk, ... ..	390	815	3,682	4,951
Whiting, ... ..	10,393	7,971	98,510	87,178
Witches, ... ..	2,570	2,079	25,940	32,162
Mackerel, ... ..	2,935	5,953	270,894	254,625
Herrings, ... ..	207,576	253,444	612,554	786,187
Pilchards, ... ..	3,197	1,333	46,683	21,759
Sprats, ... ..	3,813	2,992	8,034	8,245
Fish, all other, except Shell Fish, ...	15,715	15,721	223,792	208,346
Total, ... ..	651,608	680,626	5,497,785	5,648,312
Shell Fish :—				
Crabs, ... ..	1,800	886	55,054	53,744
Lobsters, ... ..	360	287	25,560	25,280
Oysters, ... ..	9,453	9,388	82,716	67,395
Other Shell Fish, ... ..	10,830	10,988	113,807	107,702
Total, ... ..	22,443	21,549	277,137	254,121
Total value of all Fish, ...	674,051	702,175	5,774,922	5,902,433

NOTE.—The figures for 1904 are subject to correction in the Annual Returns.



STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the IRISH COASTS during the Month and Eleven Months ended 30th November, 1904, compared with the corresponding Periods of the Year 1903.

	November.		Eleven Months ended November.	
	1904.	1903.	1904.	1903.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Brill, ... ..	18	16	476	2,060
Soles, ... ..	191	171	2,862	3,576
Turbot, ... ..	46	43	596	784
Total Prime Fish, ... ..	255	230	3,924	6,420
Cod, ... ..	1,174	1,039	18,556	14,984
Conger Eel, ... ..	726	648	7,318	6,655
Haddock, ... ..	1,444	629	13,824	6,855
Hake, ... ..	679	1,333	12,529	14,792
Herrings, ... ..	26,409	35,144	210,189	151,521
Ling, ... ..	260	76	5,376	3,905
Mackerel, ... ..	21,354	21,121	501,867	353,410
Plaice, ... ..	1,666	1,221	19,661	18,651
Ray or Skate, ... ..	771	627	9,767	7,940
Sprats, ... ..	81	2,666	1,563	7,654
Whiting, ... ..	1,612	2,256	19,600	18,926
Fish not separately distinguished, except shell fish.	3,638	3,305	36,801	37,358
Total, ... ..	60,599	70,295	860,975	649,071
Shell Fish :—	No.	No.	No.	No.
Crabs, ... ..	240	812	155,482	112,485
Lobsters, ... ..	2,163	3,218	188,840	174,093
Oysters, ... ..	119,213	181,896	314,707	441,201
Mussels, ... ..	Cwts.	Cwts.	Cwts.	Cwts.
Other Shell Fish, ... ..	646	545	7,397	13,059
	1,300	1,084	15,033	17,282
VALUE.				
	£	£	£	£
Brill, ... ..	99	58	1,280	2,048
Soles, ... ..	735	673	12,540	13,614
Turbot, ... ..	226	205	2,730	3,586
Total Prime Fish, ... ..	1,060	936	16,550	19,248
Cod, ... ..	717	803	12,165	10,899
Conger Eel, ... ..	318	326	3,947	3,844
Haddock, ... ..	716	630	10,404	5,981
Hake, ... ..	741	876	9,892	10,286
Herrings, ... ..	7,615	9,086	71,057	58,336
Ling, ... ..	144	39	2,590	1,997
Mackerel, ... ..	6,536	11,609	116,170	133,709
Plaice, ... ..	1,840	1,336	18,532	18,298
Ray or Skate, ... ..	148	163	2,518	2,323
Sprats, ... ..	26	297	307	872
Whiting, ... ..	812	963	10,344	10,184
Fish not separately distinguished, except shell fish.	1,891	1,422	16,162	15,955
Total, ... ..	22,664	28,486	200,638	291,932
Shell Fish :—				
Crabs, ... ..	1	2	699	751
Lobsters, ... ..	86	132	6,969	6,029
Oysters, ... ..	150	23	482	292
Mussels, ... ..	55	138	533	663
Other Shell Fish, ... ..	286	301	3,247	3,921
Total, ... ..	578	596	11,380	11,656
Total Value of Fish Landed, ... ..	23,142	29,082	301,968	303,588

NOTE.—The figures for 1904 are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the SCOTTISH COASTS during the Month and Eleven Months ended 30th November, 1904, compared with the corresponding periods of the Year 1903.

	November.		Eleven Months ended November.	
	1904.	1903.	1904.	1903.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Sparling, ... ..	46	25	318	213
Turbot, ... ..	599	738	6,334	8,335
Cod, ... ..	41,238	35,548	601,752	469,962
Conger Eel, ... ..	487	690	14,751	8,319
Flounders, Plaice, Brill, ... ..	8,958	11,555	114,312	101,292
Haddock, ... ..	102,615	99,730	925,209	885,891
Halibut, ... ..	891	751	40,667	128,294
Herrings, ... ..	18,638	44,429	5,336,696	4,158,443
Lemon Soles, ... ..	2,345	2,043	24,865	24,848
Ling, ... ..	4,928	4,235	127,098	86,230
Mackerel, ... ..	72	23	16,474	9,763
Saith (Coal Fish), ... ..	6,723	4,743	89,130	78,314
Skate and Rays, ... ..	5,197	4,826	89,608	64,870
Sprats, ... ..	7,886	14,085	32,677	51,316
Torsk (Tusk), ... ..	232	229	12,322	9,523
Whiting, ... ..	17,163	10,821	133,571	115,331
Fish not separately distinguished, except Shell Fish.	14,865	6,651	104,476	61,476
Total, ... ..	232,773	241,120	7,670,258	6,162,420
Shell Fish:—	No.	No.	No.	No.
Crabs, ... ..	93,358	140,703	2,203,041	2,517,069
Lobsters, ... ..	80,249	648,963	747,121	1,143,879
Oysters, ... ..	24,400	24,109	218,639	174,531
	Cwts.	Cwts.	Cwts.	Cwts.
Clams, ... ..	769	766	5,660	3,535
Mussels, ... ..	11,297	8,435	78,989	86,781
Other Shell Fish, ... ..	6,254	3,691	54,464	52,054
VALUE.				
	£	£	£	£
Sparling, ... ..	105	85	935	683
Turbot, ... ..	2,109	2,567	21,287	29,240
Cod, ... ..	20,625	16,786	246,068	210,740
Conger Eel, ... ..	218	338	6,850	4,680
Flounder, Plaice, Brill, ... ..	8,969	13,344	98,624	120,620
Haddock, ... ..	49,513	45,398	448,543	444,049
Halibut, ... ..	1,646	1,557	61,226	47,741
Herrings, ... ..	4,469	9,557	1,005,038	1,226,976
Lemon Soles, ... ..	3,955	4,234	46,399	48,454
Ling, ... ..	1,502	1,486	39,876	30,468
Mackerel, ... ..	26	13	5,831	3,987
Saith (Coal Fish) ... ..	1,212	964	15,245	13,881
Skate and Rays, ... ..	1,336	1,262	22,536	17,535
Sprats, ... ..	1,367	1,655	3,139	5,213
Torsk (Tusk), ... ..	61	47	2,784	2,184
Whiting, ... ..	4,274	3,356	42,076	42,160
Fish not separately distinguished, except Shell Fish.	7,348	2,405	55,153	18,513
Total, ... ..	108,625	105,284	2,122,009	2,277,124
Shell Fish:—				
Crabs, ... ..	536	645	14,118	15,880
Lobsters, ... ..	3,688	3,211	35,736	31,743
Oysters, ... ..	100	101	852	734
Clams, ... ..	98	114	766	500
Mussels, ... ..	906	477	5,398	5,239
Other Shell Fish, ... ..	1,262	1,032	15,321	14,129
Total, ... ..	6,590	5,580	72,191	68,225
Total Value of Fish landed,	115,215	110,864	2,194,200	2,345,349

NOTE.—The above figures are subject to correction in the Annual Returns.

RETURN OF AVERAGE PRICES for each PROVINCE and for the WHOLE OF IRELAND of certain Classes of AGRICULTURAL PRODUCTS and LIVE STOCK for the QUARTER ended 30th SEPTEMBER, 1904, and for the WHOLE OF IRELAND for the corresponding QUARTER of 1903.

PRODUCT.	PROVINCE.				Whole of Ireland, 1904.	Whole of Ireland, 1903.
	Leinster.	Munster.	Ulster.	Con-naught.		
<b>CROPS :—</b>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
Wheat, per 112 lbs.	7 3½	7 0	—	—	7 3½	—
White Oats, . . .	6 6½	6 5	6. 0½	6 0½	6 2½	6 0½
Black Oats, . . .	6 4½	5 2	—	—	5 5½	5 1½
Barley, . . .	—	7 6½	—	—	7 6½	7 8½
Hay, . . .	3 6½	2 2	3 4	2 0½	2 9½	2 8½
Potatoes, . . .	3 1	3 6	3 0	4 9½	3 3½	3 7½
Flax, . . . per 14 lbs.	—	—	6 4½	—	6 4½	5 9½
Perennial Rye Grass Seed, per 112 lbs.	—	—	8 10½	—	8 10½	12 9½
Italian Rye Grass Seed, . . .	—	—	9 9½	—	9 9½	12 8½
BUTTER, . . .	88 9½	87 9½	80 6½	79 0½	87 8	89 8½
EGGS, . . . per 120,	7 2½	7 1½	—	6 6½	6 10	7 1½
WOOL, . . . per lb.	0 9½	0 10½	—	—	0 9½	0 7½
PORK, . . . per 112 lbs.	—	45 1	46 4½	41 2	45 1½	49 2½
BEEF, . . .	—	—	—	—	55 2½	55 7½
MUTTON, . . .	—	—	—	—	62 8	57 10½
<b>STORE CATTLE :—</b>	<i>£ s. d.</i>	<i>£ s. d.</i>	<i>£ s. d.</i>	<i>£ s. d.</i>	<i>£ s. d.</i>	<i>£ s. d.</i>
One year old, per head,	7 6 9	7 5 7	6 5 0	7 4 7	6 18 4	7 3 10
Two years old, . . .	11 0 7	8 19 11	8 12 1	10 10 3	9 8 6	9 19 4
Three years old, . . .	13 11 3	13 8 4	9 0 5	11 9 6	12 8 9	12 14 9
Springers, . . .	15 0 9	13 8 6	12 15 10	14 2 11	13 11 4	14 3 8
<b>STORE SHEEP :—</b>						
Lambs, . . . per head,	1 9 4	1 5 11	0 19 6	1 7 0	1 6 2	1 4 7
Over 12 & under 24 months old, . . .	2 1 9	1 13 6	1 2 9	2 0 11	1 16 0	1 16 7
Two years old and upwards, . . .	2 1 6	1 14 0	0 19 11	2 0 10	1 17 9	1 15 8

STATEMENT showing the AVERAGE PRICES of WHEAT, BARLEY and OATS per 112 lbs., computed from Market Returns of certain quantities of these Cereals supplied to the Department of Agriculture and Technical Instruction for Ireland by Inland Revenue Officers, for each Week of the QUARTER ended 30th SEPTEMBER, 1904.

Returns received in the Week ended	WHEAT.		BARLEY.		OATS.	
	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.
	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.
July, 2.	—	—	—	—	6 8	1,139½
" 9.	—	—	—	—	6 9	1,607½
" 16.	—	—	—	—	6 6½	937½
" 23.	—	—	—	—	6 7½	782
" 30.	—	—	—	—	6 6½	1,496
August, 6.	—	—	—	—	6 6½	1,279½
" 13.	—	—	—	—	6 9½	1,324
" 20.	—	—	—	—	6 9½	2,426½
" 27.	—	—	—	—	6 4½	2,939½
September 3.	—	—	7 9	143	5 9½	7,724½
" 10.	7 2½	375	7 8	733	5 6½	7,877½
" 17.	7 2½	1,014	7 7½	2,868	5 7	11,246½
" 24.	7 4½	1,014	7 4½	2,487	5 5½	20,959½

TABLE showing the AVERAGE PRICE per 112 lbs., LIVE WEIGHT, of FAT CATTLE and FAT SHEEP sold in the DUBLIN MARKET during the QUARTER ended 30th SEPTEMBER, 1904, and also for the corresponding period during the seven preceding years.

DESCRIPTION.	YEAR.							
	1904.	1903.	1902.	1901.	1900.	1899.	1898.	1897.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Fat Cattle.	31 6½	31 9½	33 10	31 6½	32 6½	30 11½	29 0½	29 10½
" Sheep.	35 9½	33 1	32 1	32 0½	34 5½	33 1½	31 3½	32 10

STATEMENT showing the NUMBERS of CATTLE and SHEEP in respect of which "LIVE WEIGHT" Returns have been furnished to the Department of Agriculture and Technical Instruction for Ireland, as under, during the Quarter ended 30th September, 1904.

WEEK ENDED	Numbers included in Returns of Live Weight of Fat Cattle furnished by				Numbers included in Returns of Live Weight of Store Cattle furnished by Official Reporters of Prices.	Total Number of Cattle included in Returns.	Numbers included in Returns of Live Weight of Fat Sheep furnished by		Total Number of Sheep included in Returns.
	Dublin Corporation Market Authorities.	Mr. Gavin Low (Dublin).	Mr. John Robson (Belfast).				Dublin Corporation Market Authorities.	Mr. Gavin Low (Dublin).	
July 2. . . . .	75	111	38	—	—	224	25	318	343
" 9. . . . .	69	116	47	—	—	232	—	298	298
" 16. . . . .	96	78	9	—	—	183	—	223	223
" 23. . . . .	95	125	44	—	—	264	—	155	155
" 30. . . . .	71	135	25	18	18	249	30	236	265
" 6. . . . .	62	88	35	—	—	186	—	263	263
" 13. . . . .	70	87	34	65	65	256	—	94	94
" 20. . . . .	92	158	21	—	—	271	—	369	369
" 27. . . . .	76	115	26	—	—	217	—	151	151
Sept. 3. . . . .	46	84	18	23	23	171	—	297	297
" 10. . . . .	75	134	23	—	—	232	—	195	195
" 17. . . . .	113	125	20	—	—	258	14	162	166
" 24. . . . .	81	143	17	—	—	241	—	231	231
Totals. . . . .	1,021	1,499	358	106	106	2,984	69	2,957	3,066

## CREAMERY BUTTER PRICE STATISTICS.

Week ending	Oopenhagen Top Quotations.		Manchester.		Lb. Rolls. In 24-lb. case. Per Cwt.	
	Kroner per 60 Kilos.	Shillings per Cwt. approximately.	Danish and Swedish Choicest.	Irish Creameries Choicest.	Danish. Free on rail, London.	Irish. Carriage paid, Passenger Train.
			<i>All landed.</i>		<i>Cash with Order.</i>	
	Kr.	s. d.	s. s.	s. s.	s. d.	s. d.
September, . 24,	100	112 3	125 to 127	109 to 112	127 2	126 0
October, . 1,	100	112 6	125 to 126	107 to 109	127 2	126 0
" . 8,	98	110 0	119 to 122	107 to 110	124 10	123 8
" . 15,	96	107 8	117 to 119	107 to 110	122 6	121 4
" . 22,	96	107 8	116 to 118	107 to 110	122 6	121 4
" . 29,	96	107 8	118 to 120	108 to 111	122 6	121 4
November, . 5,	93	104 4	114 to 118	108 to 111	120 2	117 10
" . 12,	93	104 4	114 to 116	108 to 110	120 2	117 10
" . 19,	93	104 4	115 to 117	108 to 110	120 2	117 10
" . 26,	93	104 5	116 to 118	110 to 112	120 2	117 10
December, . 3,	95	106 7	118 to 120	112 to 114	122 6	122 6
" . 10,	95	106 7	120 to 123	112 to 114	122 6	122 6
" . 17,	95	106 8	119 to 121	115 to 116	122 6	122 6

From Manchester prices, from 8s. to 10s. must be deducted in order to arrive at the net return to a Danish Creamery; and from 5s. to 7s. to get net return to an Irish Creamery.

Danish pound rolls are free on rail, London, wrapped in parchment and in cardboard boxes.

Irish pound rolls are carriage paid per passenger train, wrapped in parchment and in cardboard boxes.

If rolls are not packed in cardboard boxes, deduct  $\frac{1}{2}d.$  per lb. = 1s. 2d. per cwt.

An extra charge of  $\frac{1}{2}d.$  per lb. is made where cash does not arrive with order.

Carriage on pound rolls per passenger train is  $\frac{1}{2}d.$  per lb., excluding box; allowing for weight of box, carriage works out at 5s. 2d. to 5s. 8d. per cwt. of butter.

## TABLES SHOWING THE EXPORTS

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT  
PORTS of EMBARKATION

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ballina, . .	155	16	134	.	305	878	6,054	6,932	626	.	626
Belfast, . .	1,728	31,661	.	1	33,390	9,575	7,374	16,949	2,292	972	3,264
Coleraine, . .	45	627	30	.	702	527	.	527	15	.	15
Cork, . . .	1,007	8,448	577	9,597	19,629	5,912	29,504	35,416	4,917	.	4,917
Drogheda, . .	7,587	4,328	.	9	11,924	15,443	23,942	39,385	1,046	289	1,335
Dublin, . .	44,279	33,498	83	1,519	79,379	75,433	99,922	175,355	20,462	154	20,616
Dundalk, . .	651	3,829	.	.	4,480	4,577	10,112	14,689	2,577	396	2,973
Dundrum (Co. Down), . .	.	27	.	.	27	.	.	.	.	.	.
Greenore, . .	221	6,620	.	.	6,841	7,436	287	7,723	74	.	74
Larne, . . .	154	7,780	.	.	7,934	684	973	1,657	29	1,804	1,833
Limerick, . .	514	388	.	.	902	51	39	90	.	.	.
Londonderry, . .	1,161	12,198	173	892	14,424	11,602	10,617	22,219	402	406	808
Newry, . . .	50	1,635	.	.	1,685	1,017	3,248	4,265	255	117	373
Portrush, . .	3	251	3	.	257	.	24	24	144	18	162
Sligo, . . .	345	560	.	.	905	1,534	4,680	6,214	6,891	.	6,891
Warrenpoint, . .	.	.	.	.	.	.	490	490	.	.	.
Waterford, . .	5,081	7,377	170	698	13,226	7,179	24,334	31,513	4,914	.	4,914
Westport, . .	245	19	166	.	430	3,289	7,204	10,493	491	.	491
Wexford, . .	573	100	5	1	679	3,835	3,633	7,468	1,572	.	1,572
Total, . . .	63,799	119,862	1,341	12,717	197,719	148,972	232,437	381,409	46,708	4,156	50,864

## AND IMPORTS OF ANIMALS.

BRITAIN during the Three Months ended 30th SEPTEMBER, 1904, showing the in Ireland.

Gonts.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	.	1	1	.	.	7,864	Ballina.
190	4	721	1,241	1,966	1	13	55,773	Belfast.
.	.	1	1	2	.	.	1,246	Coleraine.
1	1	276	530	807	1	64	60,835	Cork.
10	.	21	29	50	.	1	52,705	Drogheda
35	87	1,535	1,559	3,181	2	6	278,574	Dublin.
304	.	166	132	298	.	158	22,902	Dundalk.
.	.	.	.	.	.	.	27	Dundrum (Co. Down).
39	.	609	400	1,009	.	154	15,840	Greenore.
3	.	12	43	55	.	1	11,483	Larne.
.	.	.	.	.	.	.	992	Limerick.
1	2	45	55	102	1	5	37,560	Londonderry.
77	1	6	11	18	.	8	6,426	Newry.
.	1	.	1	2	.	1	446	Portrush.
.	.	2	1	3	.	.	14,013	Sligo.
.	.	.	.	.	.	.	490	Warrenpoint.
2	2	405	417	824	1	34	51,115	Waterford
.	.	3	3	6	.	.	11,420	Westport.
.	2	4	6	12	1	1	9,733	Wexford.
663	100	3,806	4,430	8,336	7	446	639,444	Total.



TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT  
PORTS of DEBARKATION

BRITISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ardrossan, .	807	6,897	.	.	7,704	303	849	952	253	690	773
Ayr, . . .	120	12,897	.	.	12,517	882	847	1,679	536	1,908	2,444
Barrow, . .	206	4,156	.	1	4,363	.	.	.	1,428	351	1,779
Bristol, . .	409	5,218	5	2,562	8,194	5,728	12,826	18,554	2,190	.	2,190
Falmouth, .	.	.	.	.	.	.	.	.	.	.	.
Fleetwood .	87	2,795	.	.	2,882	6,993	6,620	13,613	91	.	91
Glasgow, . .	7,225	21,687	990	1,248	31,160	2,069	6,516	8,575	7,449	796	7,747
Greenock, . .	119	2,369	13	20	2,521	98	45	143	34	147	181
Heysham, . .	516	4,328	.	18	4,363	2,489	21	2,510	1,616	.	1,616
Holyhead, .	9,832	16,449	2	1,020	26,803	34,366	23,723	58,089	9,878	.	9,878
Liverpool, .	32,013	24,497	823	2,136	58,969	78,879	148,068	226,947	19,833	533	20,366
London, . .	.	7	.	.	7	.	.	.	.	.	.
Manchester, .	5,041	777	.	.	5,818	7,205	10,078	17,283	547	.	547
Milford, . .	2,380	5,911	8	5,091	13,390	5,563	20,720	26,283	1,923	.	1,923
Morecambe, .	561	2,961	.	22	3,534	2,933	1,579	4,312	896	179	1,075
Newhaven, .	.	187	.	8	140	.	.	.	.	.	.
Newport, . .	.	.	.	.	.	.	.	.	.	.	.
Plymouth, .	606	122	.	531	1,259	51	.	51	.	.	.
Portsmouth, .	.	.	.	.	.	.	.	.	.	.	.
Silloth, . .	4,188	1,703	.	.	5,891	1,179	385	1,564	.	.	.
Southampton, .	77	134	.	65	276	175	30	205	34	.	34
Stranraer, . .	112	7,300	.	.	7,412	119	530	649	.	820	250
Whitehaven, .	.	27	.	.	27	.	.	.	.	.	.
Total, . .	63,799	119,862	1,341	12,717	197,719	148,972	232,437	381,409	46,708	4,166	50,864

## II.

BRITAIN during the Three Months ended 30th SEPTEMBER, 1904, showing the in Great Britain.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	BRITISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
67	1	81	179	261	.	3	9,700	Ardrossan.
176	2	50	142	194	1	1	17,011	Ayr.
1	.	96	204	300	.	1	6,444	Barrow.
.	1	131	244	379	2	37	29,356	Bristol.
.	.	2	.	2	.	.	2	Falmouth.
13	1	323	427	756	.	3	17,368	Fleetwood.
1	4	204	345	553	1	4	43,031	Glasgow.
.	1	2	6	9	.	.	2,854	Greenock.
.	.	24	26	50	.	.	9,033	Heysham.
44	82	1,623	1,483	3,138	1	155	98,108	Holyhead.
358	5	647	646	1,298	1	171	303,113	Liverpool.
.	.	1	1	2	.	.	9	London.
1	.	54	47	101	.	2	23,752	Manchester.
.	3	601	634	1,141	.	61	42,793	Milford.
.	.	21	23	47	1	3	8,973	Morecambe.
.	.	.	.	.	.	1	141	Newhaven.
.	.	.	.	.	.	.	.	Newport.
.	.	3	10	13	.	.	1,323	Plymouth.
.	.	.	.	.	.	.	.	Portsmouth.
.	.	14	10	24	.	.	7,479	Silloth.
.	.	3	10	13	.	.	523	Southampton.
3	.	12	43	55	.	1	8,310	Stranraer.
.	.	.	.	.	.	.	27	Whitehaven.
663	100	3,806	4,430	8,336	7	416	639,444	Total.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT  
of DEBARCATION

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ballina, .	.	.	.	.	.	.	.	.	.	.	.
Belfast, . .	.	26	.	.	26	5,739	.	5,739	.	3	3
Coleraine, .	.	.	.	3	3	2	.	2	.	.	.
Cork, . .	.	.	.	.	.	71	12	83	.	.	.
Drogheda, .	.	.	.	.	.	.	.	.	.	.	.
Dublin, . .	.	14	.	6	20	5,817	3,834	9,651	.	.	.
Dundalk, .	.	.	.	.	.	.	.	.	.	.	.
Greenore, .	.	1	.	.	1	1	.	1	.	.	.
Larne, . .	.	.	.	.	.	663	.	663	.	.	.
Limerick, .	.	.	.	.	.	58	197	255	.	.	.
Londonderry .	.	.	.	.	.	83	2,667	2,750	.	.	.
Newry, . .	.	.	.	.	.	.	60	60	.	.	.
Portrush, .	.	1	.	1	2	18	186	164	.	.	.
Sligo, . .	.	.	.	.	.	20	100	120	.	.	.
Waterford, .	.	.	.	.	.	256	.	256	.	.	.
Westport, .	.	.	.	.	.	10	.	10	.	.	.
Wexford, .	.	.	.	.	.	.	.	.	.	.	.
Total, . .	.	42	.	10	52	12,788	7,006	19,744	.	3	3

## III.

BRITAIN during the Three Months ended 30th SEPTEMBER, 1904, showing the PORTS in Ireland.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	1	.	1	.	.	1	Ballina
14	8	183	330	531	.	.	6,313	Belfast.
.	.	2	4	6	.	.	11	Coleraine.
.	1	60	73	124	.	.	207	Cork.
.	.	2	2	4	.	.	4	Drogheda.
.	60	735	618	1,313	.	2	10,986	Dublin.
.	.	4	8	12	.	.	12	Dundalk.
.	.	37	25	62	.	.	64	Greenore.
.	5	150	105	260	.	1	934	Larne.
.	.	1	.	1	.	.	256	Limerick.
.	1	33	23	57	.	.	2,807	Londonderry.
.	.	2	2	4	.	.	64	Newry.
.	.	13	13	26	.	.	182	Portluth.
.	.	13	5	18	.	.	138	Sligo.
.	.	64	99	133	.	1	390	Waterford.
.	.	.	.	.	.	.	10	Westport.
.	.	10	12	22	.	.	22	Wexford.
14	75	1,310	1,139	2,574	.	4	22,331	Total.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT BRITAIN  
EMBARKATION in

BRITISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ardrossan, .	.	12	.	.	12	821	60	881	.	.	.
Ayr, . .	.	.	.	.	.	4,781	.	4,781	.	.	.
Barrow, . .	.	8	.	.	8	.	.	.	.	.	.
Bristol, . .	.	.	.	.	.	27	.	27	.	.	.
Cardiff, .	.	.	.	.	.	.	.	.	.	.	.
Falmouth,	.	.	.	.	.	.	.	.	.	.	.
Fleetwood, .	.	5	.	.	5	1	.	1	.	.	.
Glasgow, . .	.	2	.	4	6	5,175	4,996	10,173	.	.	.
Greenock, .	.	.	.	.	.	393	1,013	1,406	.	.	.
Heysham, .	.	.	.	.	.	.	.	.	.	.	.
Holyhead, .	.	13	.	6	19	219	42	261	.	.	.
Liverpool, .	.	2	.	.	2	35	.	35	.	.	.
London, . .	.	.	.	.	.	.	.	.	.	.	.
Manchester, .	.	.	.	.	.	.	.	.	.	.	.
Milford, . .	.	.	.	.	.	1	12	13	.	.	.
Morecambe, .	.	.	.	.	.	.	.	.	.	.	.
Newhaven, .	.	.	.	.	.	.	.	.	.	3	3
Plymouth, .	.	.	.	.	.	22	.	22	.	.	.
Silloth, . .	.	.	.	.	.	650	881	1,531	.	.	.
Southampton, .	.	.	.	.	.	.	.	.	.	.	.
Stranraer, .	.	.	.	.	.	613	.	613	.	.	.
Total, . .	.	42	.	10	52	12,738	7,006	19,744	.	3	3

## IV.

during the Three Months ended 30th SEPTEMBER, 1904, showing the PORTS of Great Britain.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	BRITISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	13	19	32	.	.	925	Ardrossan.
.	1	7	13	21	.	.	4,802	Ayr.
.	.	10	13	23	.	.	31	Barrow.
.	.	21	17	38	.	1	66	Bristol.
.	.	.	.	.	.	.	.	Cardiff.
.	.	.	.	.	.	1	1	Falmouth.
11	3	139	243	385	.	.	402	Fleetwood.
.	2	97	93	192	.	.	10,371	Glasgow.
1	.	4	10	14	.	.	1,421	Greenock.
.	.	3	7	10	.	.	10	Heysham.
.	9	329	232	570	.	1	851	Holyhead.
.	4	52	57	113	.	.	150	Liverpool.
2	.	.	1	1	.	.	3	London.
.	.	7	3	10	.	.	10	Manchester.
.	1	89	117	207	.	.	220	Millford.
.	.	1	.	1	.	.	1	Morecambe.
.	.	.	.	.	.	.	3	Newhaven.
.	.	2	1	3	.	.	25	Plymouth.
.	50	337	200	697	.	.	2,228	Silloth.
.	.	2	2	4	.	.	4	Southampton.
.	5	147	101	253	.	1	867	Stranraer.
14	75	1,310	1,180	2,574	.	4	22,391	Total.

**RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the  
showing the PORTS of**

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, . . . . .	13	325	.	1	339	998	1,164	2,163
DUBLIN, . . . . .	47	.	.	.	47	.	145	145
TOTAL, . . . . .	60	325	.	1	386	998	1,309	2,307

**RETURN of NUMBER of ANIMALS EXPORTED from IRELAND to the  
showing the PORTS of DEBARKATION**

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, . . . . .	60	325	.	1	386	998	1,309	2,307

**RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the  
showing the PORTS of**

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
BELFAST, . . . . .	.	.	.	.	.	.	.	.
DUBLIN, . . . . .	.	.	.	.	.	14	.	14
TOTAL, . . . . .	.	.	.	.	.	14	.	14

**RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the  
showing the PORTS of EMBARKATION**

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.
DOUGLAS, . . . . .	.	.	.	.	.	14	.	14

ISLE OF MAN during the Three Months ended 30th SEPTEMBER, 1904,  
EMBARKATION in IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	17	17	1	.	9	21	30	.	.	2,549	BELFAST.
.	150	150	.	.	.	.	.	.	.	342	DUBLIN.
.	167	167	1	.	9	21	30	.	.	2,891	TOTAL.

ISLE OF MAN during the Three Months ended 30th SEPTEMBER, 1904,  
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	167	167	1	.	9	21	30	.	.	2,891	DOUGLAS.

ISLE OF MAN during the Three Months ended 30th SEPTEMBER, 1904,  
DEBARKATION in IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	.	2	2	.	.	2	BELFAST.
.	.	.	.	.	.	.	.	.	.	14	DUBLIN.
.	.	.	.	.	.	2	2	.	.	16	TOTAL.

ISLE OF MAN during the Three Months ended 30th SEPTEMBER, 1904,  
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	.	2	2	.	.	16	DOUGLAS.



## COASTING AND

RETURN of the NUMBER of ANIMALS SHIPPED to and from Places in Ireland  
of Embarkation

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lamba.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, .	.	.	.	.	.	79	.	79	1	5	6
" to Belfast, .	.	5	.	11	16	.	.	.	.	.	.
" to Queenstown, .	.	.	.	.	.	2	.	2	.	.	.
" to Waterford, .	.	5	.	1	6	.	.	.	.	.	.
Total, .	.	10	.	12	22	81	.	81	1	5	6
Aghada Pier to Cork, .	.	.	.	1	1	80	.	80	74	.	74
Cahirciveen to Cork, .	.	2	.	.	2	.	.	.	.	.	.
Dingle to Cork, .	.	3	.	.	3	11	90	101	1	.	1
Waterford to Belfast, .	19	.	.	.	19	.	.	.	.	.	.
" to Cork, .	.	2	.	.	2	.	.	.	.	.	.
" to Duncannon, .	.	103	.	42	145	.	.	.	.	13	13
" to New Ross, .	.	105	.	246	351	1	.	1	.	.	.
Total, .	19	210	.	288	517	1	.	1	.	13	13
Belfast to Waterford, .	.	.	.	.	.	.	.	.	.	.	.
Dublin to Waterford, .	.	.	.	.	.	.	.	.	.	.	.
Duncannon to Waterford, .	89	73	.	6	168	68	196	266	1,586	.	1,586
New Ross to Waterford, .	191	106	.	.	297	812	2,082	2,894	1,771	16	1,787
Mulroy to Portrush, .	.	.	1	.	1	.	.	.	.	.	.
Kilrush to Limerick, .	.	.	.	.	.	.	.	.	34	300	334
Ballina to Sligo, .	.	.	.	.	.	20	.	20	.	.	.
Belmullet to Sligo, .	.	14	.	.	14	.	255	255	869	.	869
Greencastle to Greenore, .	.	173	.	.	173	223	.	223	.	.	.
Greenore to Greencastle, .	4	.	.	.	4	.	.	.	.	.	.
Londonderry to Moville, .	5	11	.	1	17	.	.	.	.	6	6
Moville to Londonderry, .	1	234	3	.	238	182	72	254	17	10	27
Total, .	309	836	4	308	1,507	1,478	2,697	4,175	4,343	350	4,693

## INLAND NAVIGATION.

during the Three Months ended 30th September, 1904, showing the Places and Debarcation.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	.	.	.	.	.	85	Cork to Aghada Pier.
.	.	.	1	1	.	.	17	" to Belfast.
.	.	.	.	.	.	.	2	" to Queenstown.
.	.	.	.	.	.	.	6	" to Waterford:
.	.	.	1	1	.	.	110	Total.
.	.	.	.	.	.	.	155	Aghada Pier to Cork.
.	.	.	.	.	.	.	2	Cahiriveen to Cork.
.	.	.	.	.	.	.	105	Dingle to Cork.
.	.	1	.	1	.	.	20	Waterford to Belfast.
.	.	.	.	.	.	.	2	" to Cork.
.	.	.	3	3	.	2	163	" to Duncannon.
.	.	2	4	6	.	.	358	" to New Ross.
.	.	3	7	10	.	2	613	Total.
.	.	.	1	1	.	.	1	Belfast to Waterford.
.	.	1	.	1	.	.	1	Dublin to Waterford.
.	.	4	.	4	.	.	2,024	Duncannon to Waterford.
4	.	1	1	2	1	.	4,985	New Ross to Waterford.
.	.	.	.	.	.	.	1	Mulroy to Portrush.
.	.	.	.	.	.	.	334	Kilrush to Limerick.
.	.	.	.	.	.	.	20	Ballina to Sligo.
.	2	.	.	2	.	.	1,130	Belmullet to Sligo.
.	.	.	.	.	.	.	396	Greencastle to Greenore.
.	.	.	.	.	.	.	4	Greenore to Greencastle.
.	.	.	.	.	.	.	23	Londonderry to Moville.
.	.	.	.	.	.	1	570	Moville to Londonderry.
4	2	9	10	21	1	3	10,404	Total.

RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30th SEPTEMBER, 1904, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast, . . . . .	--	129	63	192
Cork, . . . . .	—	2	6	8
Dublin, . . . . .	—	183	148	331
Dundalk, . . . . .	—	37	44	51
Greenore, . . . . .	—	182	95	277
Newry, . . . . .	1	—	2	3
Waterford, . . . . .	—	24	24	48
Total, . . . . .	1	557	352	910

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 30th SEPTEMBER, 1904, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast, . . . . .	—	34	59	93
Dublin, . . . . .	50	387	260	697
Waterford, . . . . .	—	6	10	16
Total, . . . . .	50	427	329	806

## DISEASES OF ANIMALS IN IRELAND.

NUMBER of OUTBREAKS of SWINE-FEVER, and Number of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended	SWINE-FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection.
September, 1904, . . . . .	102	1,834

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by ANTHRAX and GLANDERS in Ireland in the undermentioned period.

Quarter ended	ANTHRAX.		GLANDERS (including Farcy)		Epizootic Lymphangitis	
	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
September, 1904, . . . . .	1	1	4	9	1	1

NUMBER of Cases of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended	Number of Cases.
September, 1904, . . . . .	Nil.

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIC-MANGE in Ireland in the undermentioned period.

Quarter ended	SHEEP-SCAB.		PARASITIC-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
September, 1904, . . . . .	13	34	34	39

Veterinary Branch,  
Department of Agriculture and Technical Instruction for Ireland,  
Dublin.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL  
into Ireland in each WEEK from

ARTICLES.	WEEK ENDED				
	3rd Sep.	10th Sep.	17th Sep.	24th Sep.	1st Oct.
<b>ANIMALS, LIVING—</b>					
Horses, . . . . .	.	.	.	.	.
<b>FRESH MEAT—</b>					
Beef, . . . . . cwt.	.	.	.	.	.
Mutton, . . . . . "	.	.	.	.	.
<b>SALTED OR PRESERVED MEAT—</b>					
Bacon, . . . . . cwt.	.	.	.	.	.
Beef, . . . . . "	.	.	.	.	.
Hams, . . . . . "	.	.	1	.	.
Pork, . . . . . "	197	.	403	118	394
Meat, unenumerated, Salted " or Fresh, . . . . . "	.	.	.	.	.
Meat preserved otherwise than by salting, . . . . . cwt.	15	.	.	.	.
<b>DAIRY PRODUCE AND SUBSTITUTES—</b>					
Butter, . . . . . cwt.	.	.	.	.	.
Margarine, . . . . . "	236	163	169	184	314
Cheese, . . . . . "	.	.	1	.	2
Milk, Condensed, . . . . . "	69	.	83	65	7
" Cream, . . . . . "	.	.	.	.	.
EGGS, . . . . . gt. hunds.	64	.	204	263	683
LARD, . . . . . cwt.	.	109	.	.	67
<b>CORN, GRAIN, MEAL, AND FLOUR—</b>					
Wheat, . . . . . cwt.	132,600	184,700	162,800	224,900	11,900
Wheat, Meal and Flour . . . . . "	7,400	15,200	5,300	3,300	30,000
Barley, . . . . . "	.	20,000	.	.	.
Oats, . . . . . "	20	80	60	40	80
Peas, . . . . . "	.	.	.	.	.
Beans, . . . . . "	.	.	.	.	.
Maize or Indian Corn, . . . . . "	206,000	43,600	64,400	293,200	240,500
<b>FRUIT, RAW—</b>					
Apples, . . . . . cwt.	39	42	.	.	.
Currants, . . . . . "	.	.	.	.	.
Gooseberries, . . . . . "	.	.	.	.	.
Pears, . . . . . "	25	227	.	40	.
Plums, . . . . . "	20	.	.	.	.
Grapes, . . . . . "	.	.	.	.	.
Lemons, . . . . . "	.	.	.	.	.
Oranges, . . . . . "	.	.	.	.	.
Strawberries, . . . . . "	.	.	.	.	.
Unenumerated, . . . . . "	.	.	.	.	.
HAY, . . . . . tons	.	.	.	.	.
STRAW, . . . . . "	.	.	.	.	61
HOPS, . . . . . cwt.	.	.	.	.	.
<b>VEGETABLES, RAW—</b>					
Onions, . . . . . bushels	1,316	2,120	230	1,503	680
Potatoes, . . . . . cwt.	.	.	.	.	.
Unenumerated, . . . . . £	8	2	2	10	18
Dried, . . . . . cwt.	.	.	.	.	.
Preserved by Canning, . . . . . "	20	.	196	23	.
<b>POULTRY AND GAME, . . . . . £</b>	.	.	.	.	.

\* This Table is confined to the Imports of certain kinds of Agricultural Produce into a request from this Department kindly consented to separate the Irish Imports (direct) form of Weekly Returns. It is hoped that the Department may soon be able to secure With these and such returns as the above, the Department will be in a position manufactured and agricultural products.

**PRODUCE** Imported direct (i.e. from the Colonies or Foreign Countries  
3rd September, 1904, to 26th November, 1904\*.

WEEK ENDED								
8th Oct.	15th Oct.	22nd Oct.	29th Oct.	5th Nov.	12th Nov.	19th Nov.	26th Nov.	
.	.	.	.	.	.	.	.	.
.	.	.	.	800	.	.	.	.
.	.	.	.	1,000	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	1	.	.	.	.	.
.	543	.	421	719	.	351	.	607
.	.	.	.	.	.	.	.	.
45	.	.	133	.	.	5	.	33
.	.	.	.	.	.	.	.	.
174	268	223	112	181	149	96	.	174
24	46	19	1,353	.	63	33	.	1
.	.	.	.	.	.	.	.	46
1,800	600	.	3,437	420	26	131	.	2,004
60	370	.	1,197	.	1,282	.	.	864
124,700	215,100	263,100	268,500	133,400	102,600	48,900	.	.
35,200	46,000	3,200	72,000	3,900	9,900	34,600	.	900
17,300	22,200	.	.	.	52,800	200	.	31,900
10,300	.	.	.	.	.	.	.	.
180	140	240	50	.	40	20	.	100
341,700	75,200	465,500	86,100	209,700	200,500	400	.	144,500
181	.	10	1,154	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
60	.	.	.	.	.	.	.	.
.	84	184	.	39	.	33	.	.
.	.	.	128	.	.	72	.	32
2,764	1,060	2,437	1,634	2,338	1,470	2,802	.	1,334
.	.	.	9	.	.	.	.	2
4	40	.	.	32	20	.	.	.
.	.	.	.	.	.	.	.	.

Ireland from the Colonies and Foreign Countries. The Board of Customs have in answer from those of the United Kingdom, and to supply this Department with them in the returns of Imports of all classes into Ireland which are re-shipped from Great Britain, to gauge the economic dependence of this country on other countries for its supplies of

Statistics and Intelligence Branch,  
Department of Agriculture  
and Technical Instruction for Ireland.

## EMIGRATION.

RETURN of the Numbers, Nationalities, and \*Destinations of the Passengers that left the United Kingdom for places out of Europe during the Month ended 30th November, 1904, and the Eleven Months ended 30th November, 1904, compared with the corresponding periods of the previous Year.

NATIONALITY.	BRITISH EMPIRE.						FOREIGN COUNTRIES.			Grand Total.	Total for corresponding Period of 1903
	British North America.	Australia and New Zealand.	British South Africa.	India, including Ceylon.	Other British Colonies and Possessions.	Total.	United States.	Other Foreign Countries.	Total.		
Month ended 30th November.											
English, . . .	1,905	1,349	1,850	753	448	6,105	5,536	491	6,027	12,132	10,771
Scotch, . . .	225	170	376	19	50	840	1,034	92	1,126	1,966	1,773
Irish, . . .	110	108	118	5	6	347	2,366	19	2,385	2,782	1,866
Total of British origin.	2,240	1,627	2,144	777	504	7,292	8,936	602	9,538	16,830	14,410
Foreigners, . .	1,408	22	468	18	33	1,949	14,292	158	14,410	16,899	10,548
Nationalities not distinguished.	5	-	-	470	206	681	191	177	368	1,049	627
Total, . . .	3,653	1,649	2,612	1,265	743	9,922	23,419	937	24,356	34,278	25,585
Total for corresponding period, 1903.	3,815	1,898	4,960	932	720	11,825	12,986	774	13,760	25,585	
Eleven Months ended 30th November.											
English, . . .	52,939	10,352	19,654	3,953	3,636	90,534	73,711	4,175	77,886	168,420	170,812
Scotch, . . .	12,512	1,587	4,247	341	242	19,029	16,360	623	16,983	36,012	35,436
Irish, . . .	2,876	1,021	1,105	53	37	5,092	51,929	205	52,134	57,226	44,861
Total of British origin.	68,427	12,960	25,006	4,347	3,915	114,555	142,000	5,003	147,003	261,658	251,109
Foreigners, . .	20,555	246	5,058	188	252	26,599	132,133	1,861	133,994	160,593	174,293
Nationalities not distinguished.	75	6	2	1,976	2,064	4,123	1,262	2,013	3,275	7,398	6,996
Total, . . .	89,057	13,212	30,066	6,511	6,231	145,377	275,395	8,877	284,272	429,649	432,398
Total for corresponding period, 1903.	96,776	11,667	59,943	5,935	6,556	180,877	243,747	7,774	251,521	432,398	

\* The destinations given are, in all cases, based on the ports at which the passengers contracted to land.

NOTE.—The above figures being made up at the earliest possible date after the close of each Month, are subject to correction in the Annual Returns.

DEPARTMENT OF AGRICULTURE

AND

TECHNICAL INSTRUCTION FOR IRELAND.

JOURNAL.

The Meeting of the Council of Agriculture—The Vice-President's Address—Calf Rearing Experiments—Swede Leaf Spot—The Earnings of Migratory Labourers—Flax Experiments—The Culture and Curing of Tobacco—The Packing of Butter—The Results of Field Experiments—Calf Meal—The Working of the Fertilisers and Feeding Stuffs Act—Official Documents—Notes and Memoranda—Statistical Tables.

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No. 3.

APRIL, 1905.



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## NOTICE.

*Communications respecting the literary contents of this JOURNAL should be addressed to the Superintendent of the Statistics and Intelligence Branch, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin.*

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## THE COUNCIL OF AGRICULTURE.

The seventh meeting of the Council of Agriculture was held on Thursday, 9th February, 1905, in the Royal University of Ireland, Earlsfort-terrace, Dublin.

The Chair was taken at 11 o'clock, a.m., by the Right Hon. Sir Horace Plunkett, P.C., K.C.V.O., F.R.S., Vice-President of the Department.

The following were present :—

*Representing the Department.*—The Vice-President : Mr. T. P. Gill, Secretary ; Professor J. R. Campbell, Assistant Secretary in respect of Agriculture ; Mr. George Fletcher, Assistant Secretary in respect of Technical Instruction ; Mr. W. S. Green, Chief Inspector of Fisheries ; Mr. W. G. S. Adams, Superintendent of the Statistics and Intelligence Branch ; Mr. J. P. Walsh, Clerk in Charge of Accounts ; Mr. D. H. Lane, Inspector of Fisheries ; Mr. D. S. Prentice, M.R.C.V.S., Superintending Travelling Inspector ; Mr. J. D. Daly, Senior Staff Officer ; Mr. T. Butler ; Mr. J. V. Coyle ; Mr. J. Hogan ; Mr. H. G. Smith ; Mr. R. H. Lee.

### MEMBERS OF COUNCIL, ACCORDING TO PROVINCES.

#### *Leinster.*

Robert A. Anderson ; Gerald J. Brenan, J.P. ; Algernon T. F. Briscoe, J.P. ; Stephen J. Brown, J.P. ; Captain Loftus A. Bryan, J.P., D.L. ; Thomas J. Byrne, J.P. ; Thomas M. Carew ; Major J. H. Connellan, J.P., D.L. ; William M. Corbet ; William Delany, M.P. ; Robert Downes, J.P. ; Colonel Nugent T. Everard, J.P., D.L. ; William Field, M.P. ; Rev. T. A. Finlay, M.A. ; Toler R. Garvey, J.P. ; Marcus Goodbody, J.P. ; Patrick Hanlon ; Walter M'M. Kavanagh, J.P., D.L. ; Patrick J. Kennedy, J.P., M.P. ; Nicholas B. King ; James M'Carthy ; James MacMahon, J.P. ; John J. Molloy, J.P. ; George F. Murphy, J.P. ; Patrick J. O'Neill, J.P. ; Charles H. Peacock, J.P. ; Henry Reynolds ; William R. Ronaldson ; R. Norman Thompson, M.B., J.P. ; James Mackey Wilson, J.P.

#### *Ulster.*

Edward Archdale, D.L. ; Frank Barbour ; H. D. M. Barton, F.S.I. ; William Edmund Best ; Rev. E. F. Campbell, M.A. ; Alexander L. Clark, J.P. ; George Knox Gilliland, J.P., D.L. ; John Keenan, J.P. ;

Arthur S. Lough, J.P. ; Francis J. Lynch ; T. P. M'Kenna ; H. de F. Montgomery, J.P. D.L. ; James S. Moore, J.P., D.L. ; Rev. Laurence O'Kiernan, C.C. ; Robert H. S. Reade, J.P., D.L. ; Colonel R. G. Sharman-Crawford, J.P., D.L. ; William Smyth, J.P. ; Captain T. Butler Stoney, J.P., D.L. ; Thomas Toal, J.P.

#### *Munster.*

James Byrne, J.P. ; Captain William C. Coghlan, J.P. ; Maurice Connery, M.D., J.P. ; Thomas Corcoran, J.P. ; Thomas Duggan ; Jeremiah J. Howard, J.P. ; Most Rev. Denis Kelly, D.D., Lord Bishop of Ross ; Thomas Linehan, J.P. ; William M'Donald ; Patrick S. Manning, Michael Mescal, J.P. ; the Right Hon. Lord Monteagle, K.P., D.L. ; Patrick F. Mullally, J.P. ; Edmond Nugent, J.P. ; Cornelius O'Callaghan ; Alexander O'Driscoll, J.P. ; George O'Gorman ; Hugh P. Ryan ; John Ryan, J.P. ; George F. Trench, J.P.

#### *Connaught.*

Rev. T. C. Connolly, C.C. ; P. J. Costello ; Very Rev. Canon Donohoe, P.P., V.F. ; Sir Josslyn Gore-Booth, Bart. ; James P. MacGuire ; Rev. P. M'Loughlin, C.C. ; Daniel Morrin ; Colonel John P. Nolan, J.P., M.P. ; Edward P. O'Flanagan.

Mr. J. D. Daly acted as Secretary to the meeting.

The Minutes of the sixth meeting, 12th April, 1904, a copy of which had been sent to each member of the Council, were taken as read, and were according signed.

The Vice-President delivered his address, which is printed at pp. 416 *et seq.*

The Council reaffirmed the arrangement made at previous meetings whereby the speech of a proposer of a resolution was limited to ten minutes, and the speech of a member other than the proposer of a resolution, to five minutes.

The following resolution, although not appearing on the agenda paper, was allowed by the Vice-President to be moved, as it dealt with a matter of urgent public importance which was referred to in his address :—

“That this Council most strongly urge the Department of Agriculture and Technical Instruction for Ireland to take every measure in their power to prevent any alteration in the existing law regarding the importation of live cattle into the United Kingdom.”

The resolution, which was proposed by Colonel R. G. Sharman Crawford, D.L., and seconded by Mr. James Byrne, J.P., was passed unanimously.

The Council had under consideration the question of establishing a Herd Book for Irish Shorthorn Dairy Cattle.

After considerable discussion, it was unanimously agreed that the establishment of such a Herd Book was eminently desirable, and that the Department be requested to consider the best means for carrying out the suggestion.

The Vice-President said that the Department would consider the matter in consultation with the Special Advisory Committee on Live Stock.

The following resolution was proposed by Mr. John Ryan, J.P., and seconded by Dr. Connery :—

“That considering the partial failure of the potato crop, and that one of the best preventives of a recurrence of such failure is a renewal of seed, the time is most opportune for the Department to show its practical interest in the needs of the country, by making arrangements for the purchase and importation of fresh seed ; such seed to be distributed through the County Committees at a reasonable price—the costs of importation, inspection, and any loss in sale to be paid out of either the Department's or the joint funds.”

With the consent of Mr. Ryan and Dr. Connery, the following resolution, standing on the agenda paper in the name of Mr. William Delany, M.P., was added to the foregoing :—

“In view of the almost total failure of the potato crop in the West of Ireland last season, and the consequent existing distress, deepening into famine in many instances, we recommend the Department to provide out of the reserve fund at its disposal a sufficient supply of sound seed for use in the ensuing spring, to be distributed free in the distressed districts ; and in cases where contracts have been already entered into by local authorities, the Department should bear part of the cost, and also supervise the distribution and see that the seed is of good quality.”

After some discussion, it was decided to defer the decision on this resolution until Mr. Delany's resolution on tillage was dealt with.

Whereupon the following resolution was proposed by Mr. William Delany, M.P., seconded by Mr. Corbet :—

“That in order to preserve the remnant of our population, which is rapidly disappearing owing to continued emigration, an extension of tillage and an extensive breaking up of grazing lands becomes an absolute necessity. This Council is, therefore, of opinion that the Department should give a more generous encouragement to agriculture—(1) by offering substantial prizes for

the best-managed tillage farms in each county, and for the successful growing of crops suitable to the respective localities therein ; (2) by the raising of approved varieties of agricultural seeds under expert supervision, upon lands acquired for the purpose or already in the Department's hands, to be supplied to small farmers and labourers upon easy terms."

It was proposed by Mr. Stephen Brown, and seconded by Mr. P. J. Kennedy, M.P., that the resolution be amended by omitting all after the first sentence.

After some discussion, it was suggested that Mr. Delany's resolution should read as follows :—

"That in order to preserve the remnant of our population, which is rapidly disappearing owing to continued emigration, an extension of tillage and an extensive breaking up of grazing lands becomes an absolute necessity. This Council is, therefore, of opinion that the Department and the County Committees should give special encouragement to agriculture—(1) by offering substantial prizes for the best-managed tillage farms in each county, and for the successful growing of crops suitable to the respective localities therein ; (2) by the raising of approved varieties of agricultural seeds under expert supervision, upon lands acquired for the purpose or already in the Department's hands, to be supplied to small farmers and labourers upon easy terms."

Mr. Delany and Mr. Corbet accepted the suggestion.

Mr. Brown's amendment was by leave withdrawn.

Mr. Delany's resolution, as amended, was then put and carried unanimously.

On the suggestion of Most Rev. Dr. Kelly, Lord Bishop of Ross, who explained the action of the Agricultural Board in allocating a sum of £10,000 in connection with the scheme of the Local Government Board for the supply of seed potatoes, Mr. Ryan and Mr. Delany withdrew the resolution which had been previously moved.

The following resolution, standing on the agenda paper in the name of Mr. William Delany, M.P., was ruled out of order :—

"That this Council has observed with amazement the facts put before Parliament and the public during the past twelve months, showing that a number of Catholic gentlemen in the Veterinary Branch of the Department have been restricted to salaries of approximately £95 a year, after service of eleven years and upwards, whilst persons of other persuasions and of less experience have been invidiously selected for lucrative posts ; and, having regard to the detrimental effect which such a state of things must have on the work for which the Department was called into existence, this Council desires that the grievance be at once rectified, and that the persons responsible be suitably dealt with."

The following resolution was proposed by Mr Stephen Brown, seconded by Mr. Thomas J. Byrne, and carried unanimously :—

“That arterial drainage being of vital importance to agriculture, and the powers given to County Councils by the Local Government Act of taking over the business of existing Drainage Boards having been successfully exercised in many instances, the time has come when these powers should be extended to the initiation of new schemes of drainage ; and that the Department be requested to urge upon the Government to amend the Local Government Act in this respect.”

The following resolution, standing on the agenda paper in the name of Mr. Thomas J. Byrne, was, by leave, withdrawn, the subject having been discussed in connection with Mr. Brown's resolution on arterial drainage :—

“That, in the opinion of this Council, it is absolutely necessary that local Drainage Boards should be established in each rural district in Ireland, for the purpose of maintaining and improving the minor drain arteries of the locality ; such boards to derive their funds from rates levied on the lands affected.”

The following resolution was proposed by Mr. George F. Trench, seconded by Lord Monteagle, and carried unanimously :—

“That the Department take the necessary steps for increasing the number of Agricultural Schools or Educational Farms, with a view to training in scientific agriculture the young men and women of the farming classes.”

Captain William C. Coghlan, J.P., read a brief memorandum on the method of itinerant instruction.

The Vice-President thanked Captain Coghlan on behalf of the Council for his suggestions, which would be duly noted by the Department.

The following resolution was proposed by Captain Loftus A. Bryan, D.L., seconded by Mr. Thomas Toal, J.P., and carried unanimously :—

“That the Department be requested to consider, and if found desirable, to arrange for the re-insurance of live stock insured in Farmers' Mutual Live Stock Insurance Societies.”

Lord Monteagle called attention to the urgent need of special provision being made by the Department for looking after the interests of Irish produce in the markets of the United Kingdom ; and asked what steps the Department had taken in the matter since the last meeting of the Council.

Mr. Alexander O'Driscoll, in this connection, spoke as to the needs of the fishing industry.

Mr. Linehan drew attention to a recent prosecution for importing margarine improperly marked, which was evidently intended to be mixed with butter.

The Vice-President explained what the Department had done and were doing in the matter of transit and markets.

The following resolution was proposed by Mr. William Field, M.P., seconded by Mr. King, and carried unanimously :—

“That the attention of the Local Authorities be drawn to the necessity of compulsory sheep dipping.”

The following resolution was proposed by Mr. William Field, M.P., seconded by Mr. Charles Peacocke, and carried unanimously :—

“That the legislation necessary for greater and cheaper transit facilities is a matter of urgent national importance.”

The following resolution, standing on the agenda paper in the name of Mr. James Byrne, J.P., was by leave withdrawn, the subject being covered by Mr. Delany’s resolution on the extension of tillage :—

“That in order to promote taste and thrift among our peasantry, a proportionate grant should be offered by the Department to each County Council in Ireland who give premiums to those cottagers who keep their houses neat, and their gardens well cultivated.”

The following resolution was proposed by Mr. Alexander L. Clark, J.P., and seconded by Mr. R. H. Reade, D.L. :—

“That the Department should introduce into Parliament in the coming session a Bill to amend the Irish Fishery Laws, based on the terms agreed to at the Conference held in April, 1903, between the Department and representatives of the mill owners.”

After a discussion it was proposed by Mr. William Field, M.P., and seconded by Colonel Nolan, M.P., that the resolution be amended so as to read as follows :—

“That the Department urge on the Government the necessity of introducing into Parliament during the coming Session a Bill to amend the Irish Fishery Laws in view of the alterations in the existing law which are desirable in the interests of the fisheries and of the users of water power.”

Mr Clark and Mr. Reade accepted the amendment.

The resolution as amended was accordingly put and carried unanimously.

Mr. R. H. Reade read a memorandum on certain flax retting and scutching experiments conducted by the Flax Supply Association, and exhibited samples of flax.

The Vice-President thanked Mr. Reade for his interesting paper, and said that the Department would have the paper printed and circulated among the members of the Council.

The following resolution was proposed by Mr. Hanlon, seconded by Mr. William Delany, M.P., and carried unanimously :—

“That whilst approving of the encouragement given by the Department to the breeding of the Irish draught horse, we consider the premium of £50 quite inadequate to effect the object desired, and that the premium should be increased so as to allow the giving of free nominations to mares for these stallions (or as is done for other breeds); and further that the mares should be selected by Inspectors at the same time and place as mares for other stallions. That the number of this class of stallions selected is entirely too small and could be added to by again inspecting them and allowing all to enter except those rejected before for unsoundness; and if a sufficient number of a high class cannot be found, that the Department purchase promising yearlings or foals of sound parentage for the purpose.”

The following resolution was proposed by Mr. Hanlon, seconded by Mr. Downes, and adopted :—

“That we request the Department to seek Parliamentary powers to prevent unsound stallions being offered for service either by travelling or by advertising.”

The Vice-President explained that it was not within the functions of the Department to promote legislation of this nature, and that it was not probable that the Government would introduce a measure of the kind desired. It would be better if such a Bill were introduced by a private member. Possibly Mr. Delany might take up the matter.

Mr. Delany said that he would consult the Chairman of his Party.

Mr. Delany, M.P., asked what representations the Department had made to the English Board of Agriculture with reference to the recent Order restricting the importations into Great Britain of Irish swine.

The Vice-President said that the Department had urged their views in the strongest manner possible, and had done all they could to induce the Board not to issue the Order in question.

Mr. O'Driscoll said he desired to call the Department's attention to the case of certain grants under the County Kerry Scheme of technical instruction which had not been sanctioned by the Department.

The Vice-President suggested that Mr. O'Driscoll should confer with Mr. Fletcher, Assistant Secretary in respect of technical instruction, after the meeting.

Mr. O'Driscoll accepted the Vice-President's suggestion.

On the motion of Colonel Sharman Crawford, D.L., seconded by Mr. Cornelius O'Callaghan, a vote of thanks to the Vice-President was passed unanimously.

The Vice-President replied.

The proceedings terminated at 6.10 o'clock,



## THE VICE-PRESIDENT'S ADDRESS TO THE COUNCIL OF AGRICULTURE.\*

MY LORDS AND GENTLEMEN,—I propose to address you on a few subjects about which, I think, you and the public will be glad to have the Department's views. Some of these subjects will be introduced by members of the Council who have given notices of motion. I do not wish to anticipate their speeches, but, knowing that our time will be short enough for the adequate consideration of the large number of questions you have given notice of your intention to discuss, I think I can give you some information and perhaps some suggestions, which will enable you to make the best use of the time at your disposal.

### CANADIAN STORE-CATTLE.

There is one question just now in the public mind which is so vitally concerned not only with the Department's sphere of operations, but with the entire agricultural interest of Ireland, that I think its omission from the agenda paper is probably due to the expectation each of you had that somebody else would introduce it. I refer to the apprehended removal of the restrictions upon Canadian stores. Last summer the discussions on the fiscal controversy made me fear that a vigorous effort would be made to induce Parliament to reconsider the legislation it had enacted in 1896 for the protection of our flocks and herds from disease. Some remarks of mine at the Agricultural Board, not intended for publication, appear to have given the impression that I was inclined to raise an alarm on this subject in Ireland at a moment when Lord Onslow was assiduously allaying such an alarm in England. I think we may make our minds easy upon this question. The policy of the present Government has been definitely declared, and, in spite of a much-quoted recent utterance of Sir Henry Campbell-Bannerman, I think that the reasons why the same policy should be persisted in by whatever Government succeeds the present are so cogent that we need not apprehend any disturbance of the present system. It may be well to state briefly the general considerations which, I think, will secure the continuance of the *status quo*.

It may be that at the moment Canadian cattle can show a clean bill of health; and while the existing restrictions remain they may, and I

\* See p. 409.

hope will, continue in this condition. But if the restrictions were removed I do not believe it would be possible so to police the thousands of miles of border between the Republic and the Dominion as to safeguard us from the danger of admitting cattle from the United States. I speak with some knowledge on this subject, as I have been in charge of large herds of cattle on both sides of that border, and feel myself capable of dodging the police if I were in that line of business. But in any case the mere uncertainty as to the safety from disease of our flocks and herds would dislocate the entire cattle trade of the United Kingdom. The breeders of these islands enjoy a valuable export trade with many distant countries in pure-bred stock, which the danger of disease would destroy. But the Irish farmer is more interested in the enormous store trade with Great Britain. One of the most important facts which came before us shortly after the Department was started—the fact, I may say, which largely influenced our cattle policy—was that the purchasers of Irish stores complained, and not without some reason, that our cattle, while healthy and vigorous, were pre-eminent in their growing, but disappointing in their fattening qualities. Now, thanks to the way in which the County Committees have supported the Department's policy—the policy of introducing pure-bred cattle and so early-maturing blood, we have gratifying evidence from farmers, commission men, and others, that the reputation of Irish stores in Great Britain is rising, and that many British farmers who formerly had a hankering after Canadian stores, would now strenuously resist any legislation which would harass the breeders and growers of Irish stores. And this is just what would happen if the restriction were removed. Taking the three classes in Ireland who are primarily concerned, the graziers on the rich lands of Leinster might reap some slight immediate but not lasting advantage. The owners of second-class grass lands would suffer, for a time at any rate, while the injury inflicted upon the breeders of young stock would probably be more permanent. There are, of course, arguments of a wholly different character which might be adduced in favour of the proposed legislation. There are those, for example, who, thinking imperially, would like to seize this as an opportunity for Colonial preference. But we may, on this subject, think insularly and protect what is, after all, even in Great Britain, the largest industry. From what I have said I think the Department's attitude will be fairly clear, and I am sure that it accurately represents the wishes of this Council in the matter.

## REVIVAL OF TILLAGE.

The contingency we have just been discussing is very far from being the only serious economic change which the Irish farmer would be wise to think about. I, personally, welcome the discussions in the newspapers to which this scare has given rise, because it has set people thinking upon Irish agricultural conditions and possibilities in a very useful way. Nothing is more important in the whole of the Department's work than those educational facilities which are intended to develop the adaptability of a class proverbially conservative in its methods and instincts, and in Ireland, owing to historical causes, peculiarly sceptical of suggested innovations. I commend to your thoughtful consideration a discussion which this Council initiated a year ago, and which is again brought forward in one of Mr. Delany's resolutions—the revival of tillage. The consideration of this subject has, in my judgment, been greatly advanced by Professor Wilson's article in the January number of the Department's *Journal*. Whatever legislative changes, fiscal or other, the future may have in store for us, certain it is that in Ireland a new agrarian order is being evolved. The central aim of Irish land reform—that of keeping in Ireland a prosperous peasantry, will depend for its success upon a vastly improved agricultural system, I might almost say a revolutionised agricultural economy. Now Professor Wilson deals with, and invites discussion upon, a variety of questions all highly relevant to the main issue which the Council discussed at its last meeting and revives to-day. We may not accept all Professor Wilson's calculations, but he has at least furnished an admirable basis for discussion, and I hope that members of the Council will try to direct the attention of the best agricultural opinion of the country to his article.

## MARKETING OF IRISH PRODUCE.

I think it will be useful if I say a few words upon the more general aspects of the important question to which Lord Monteagle calls attention—the question of what can and ought to be done by the Department to aid in the marketing of Irish produce in Great Britain—as they present themselves to me in the light of enquiries made and information gained. I take it you will accept the proposition that the function of the Department is here limited to doing that which cannot be done better by private enterprise. We may also exclude from this discussion the cost of freight, which is not the point Lord Monteagle desires to raise. The point to which I wish mainly to direct attention is this.

I notice that the ideas which prevail in Ireland as to what the Government can and ought to do in the marketing of produce are based generally upon the action of certain European and Colonial Governments, but more especially upon the example of Denmark, the competing country from which in this, as in some other matters, Ireland has most to learn. A brief consideration of the conditions affecting the distribution of Danish and Irish produce respectively in the British market will, I think, assist the Council in discussing this important subject. The Danish producer for the British market is dealing at a considerable distance with traders who speak a tongue he does not understand, who use a currency almost as difficult as the language, and practise a commercial system different from his own. All these things stand between the Danish producer and his market, and he has thus need for a foreign agent, such as the Irish farmer does not require. Further, owing to the conditions under which the Danish trade is carried on, it can be easily supervised. Danish produce has only a few routes of entry. The consignments come in large quantities and at regular intervals. But there is another still more important consideration; the Danish produce starts on its journey so carefully classified and registered that it can be easily controlled and safeguarded. This latter condition is of fundamental importance in the attainment of success in marketing, and it is in this direction, rather than that of agents or commissioners, that we must look if we are to win the superior position for Irish produce in the English market. In a word, the question we have to ask—the vital question for the winning of the market—is, how we can increase the reputation of, and confidence in, Irish produce. Denmark's great asset is that it has won such reputation and confidence. I cannot too strongly urge upon you the importance of this point. For, under the conditions of modern distribution the first essential to success in the fight for the market is to win the confidence of the merchant—confidence that the sample is representative of the bulk, that a "repeat" order—to use the trade jargon—will be repeated, and that it will really be a repetition, and not an interesting but time-wasting variant. In Denmark the organisation of the trade is so perfect at the producing end, where—let me reiterate this vitally important point—the chief work has to be done, that any consignment, however small, which fails to come up to the standard of its class, and so weakens the confidence of the merchant and injures the interest of the producers, can be traced back to the producer responsible for its deficiencies. I am not sure that the Irish producer is quite ready for this automatic detective system, which would trace back a

peccant egg, if not to the hen which the Department had (if I may acknowledge Mr. Dillon's tribute to our skill) taught to lay it, but to the farmer who had failed to start it on its journey properly packed and graded in its first freshness. In short, if we are to hold our own in the market of to-day, the most essential thing is that we perfect our methods of production and secure likewise economic combination in distribution. If our supply is sound it will, in the case of an old established trade, find its market. The problem for us to-day is to secure first, continuity and regularity of supply; second, grading and uniformity; third, supplementing this point, a system of registration by which responsibility can be traced; and fourth, combination in the despatch of produce. But these things are mainly within the sphere of organised voluntary effort. In my opinion the development of agricultural co-operation is far more important than anything which the Department can do in this matter at the moment. We do our best to trace cases of such frauds as selling bad foreign produce as Irish, or good Irish produce as foreign, work which in order to be efficient must be done without too much publicity. Beyond development along the lines of the existing work of inspection and report, we do not see that expenditure would be justified in attempting to establish in England any such agencies as foreign and distant nations require. Any practical suggestions for dealing with this important matter will be welcome. But depend upon it, much of what is expected from Government assistance in the market can really be done efficiently and economically only by Irish producers in Ireland.

#### SPECIAL CIRCUMSTANCES OF NEW AND EXPERIMENTAL INDUSTRIES.

What I have said as to the limits of State assistance in the distribution of produce does not, however, equally apply where a new industry is trying to put a new and unknown product upon the market. Recently, the Department has devoted a great deal of thought and attention to the development of a trade in Irish fruit. So far we have only dealt with production, and the time for considering the best means of marketing has not yet arrived. But we recognise that in this case we have to bridge over this difficulty: that you cannot expect people to go to the expense of producing a commodity for a demand which does not exist, and, on the other hand, you cannot create a market for a commodity which is not produced in a sufficient quantity to make it a known article of common consumption. Here it is legitimate for the Department to step in by giving some financial assistance to the pioneer producers, and also by going to

some expense in advertising and finding the best market for their produce. I adhere to the principle (which, I think, you have approved), as governing these cases, that it would be legitimate for the Department, for a limited period and to a limited extent, to meet the difference in the cost of carriage between the rates applying to the product of a small experimental industry and the rates which would be charged where the industry was permanently established on a commercial scale.

#### TECHNICAL EDUCATION IN ITS RELATION TO AGRICULTURE.

I always ask you to listen to a few words upon the most important, most difficult, and least popular part of our work—technical education both for agriculture and industry.

From time to time I have made reference to the policy of the Department in respect of agricultural education, and I may now say that we have arrived at a well-defined stage in our practical programme. Those County Committees who were fortunate enough in getting fully trained men in the early years, have now entered on what you will recollect was to be the second stage of our programme, and have made provision for systematic instruction to the sons of farmers. Sixteen agricultural classes and schools are now in session in nine counties, attended by some three hundred students. The country and the Department are now ready for rapid progress, and next year will probably see a great increase in the provision for systematic agricultural instruction.

#### AGRICULTURAL STATIONS.

Closely allied to this question of agricultural education is the establishment of agricultural stations, of which four (one in each province) have been recently acquired. These, at Avondale, Co. Wicklow; Ballyhaise, Co. Cavan; Athenry, Co. Galway; and Clonakilty, Co. Cork, are all intended to serve as centres from which farmers will obtain stock sires, new varieties of seeds of farm crops, and general information, while at the same time they will provide facilities for the training of agricultural apprentices.

#### APPOINTMENT OF TEACHERS IN TECHNICAL SUBJECTS.

You will notice that we have here made a very considerable advance in the decentralisation of our agricultural operations. If you ask me why we did not do these things at an even earlier date, the answer is,

that had we done so, it would have been necessary to man all these institutions with "undesirable aliens." Our calculation is that the staffing of these institutions with Irishmen who have been trained through the Department's educational machinery will be quite feasible. We have not yet got through the terribly trying period of a deficiency of native teachers in technical subjects, but in our forthcoming Annual Report you will see that my successor will, in the matter of appointments, be in as enviable a position as mine was the reverse. I think it is sometimes forgotten that the great majority of the appointments which are made under the Agricultural and Technical Instruction Act are really made by the County and Urban Committees, and that the Department's function is limited to seeing that the persons appointed are qualified. I look forward to the time, not far distant, when the "unspeakables," who now find that the worst term of abuse which can be hurled at an Irishman is to call him Scotch, will be able to point to one service, at any rate, that they have rendered to the country, namely, the training of all the experts that the Department and the Local Committees can use, and a very considerable surplus besides. On the technical instruction side of the Department's work, as distinct from the agricultural side, the same general remarks hold good.

#### CONSTITUTIONAL POSITION, FUNCTIONS AND INFLUENCE OF THE COUNCIL OF AGRICULTURE.

Gentlemen, I would ask you to bear with me while I say just a few further words upon the working out of the general scheme of development which is within the scope and sphere of this Department's operations. I desire to do so because, while I am not wiser as a political prophet than the next man, I recognise that the Government which appointed me might conceivably be a thing of the past before your next meeting; so that this might be my last chance of addressing you. This is your seventh meeting. At your first meeting, now nearly five years ago, I defined your constitutional position, your function, your actual and potential influence. I had then to meet the contention that because your functions were deliberative and not administrative, because you could only talk and could not act, you had neither power nor influence. I mentioned incidentally that if the working head of the Department lost your confidence his position would be untenable. The method of your own appointment makes you so truly representative of the country as a whole that no Government would retain in office a Vice-President

who had not your confidence. And if they did the whole machinery would be blocked, because the Agricultural Board, two-thirds of which you elect, and which controls the greater part of the Department's endowment, would stop the supplies. There are members of the Agricultural Board here who, I think, would repudiate the suggestion that their powers are unduly restricted, or that they hesitate to exercise them. And I think they will agree with me that in their joint deliberations, both the Department and the Board have ever before their minds the way in which their actions will appear when reviewed by this Council. I think you will understand the situation perfectly, but the public does not. Popular control, devolution—to use the latest term—is in everyone's mouth, but just because the Vice-President has not done some outrageous thing which has made it necessary for either the Government to remove him, or for you to say that he has outstayed his welcome, because, moreover, the Board sufficiently know your mind, and, to the best of their power, act in accordance with your wishes, and because in these conditions you do not take any revolutionary action, but content yourselves with a helpful, constructive criticism, we find, after six meetings of this Council, it is solemnly declared by some popular instructors that you have verified the predictions they confidently made of your impotence and incompetence.

Now, gentlemen, remember I am not resenting criticism of myself. I should not be fitted for Irish public life if, after satisfying my own conscience that I was doing my best, I cared a straw what anybody said to the contrary. I admit that I sometimes feel very bitterly the unjust and ungenerous things which are said about some of my colleagues, men who are devoting themselves with a zeal I have never seen surpassed in any public service to the development of the country, whether of their birth or their adoption. Here I am concerned only for the future influence of the popular element in this new machinery for the development of the resources of the country, and more particularly in your influence, because you stand at the head of the entire organisation. Unless the people look upon you as a body upon which they can rely to bring and keep the work of the central authority in touch with the needs of the country, the Department, the Boards, the net-work of popularity constituted Committees, in fact, the whole scheme of work would not be fulfilling, as I am confident, in spite of all our difficulties, it is fulfilling, the purpose for which this system was called into being.



If I felt for a moment that my tenure of office in any way interfered with the working out of the scheme of Irish development upon the lines originally laid down, if I could believe that I in any way hindered the exercise of popular control or restricted the co-operation of the popular bodies with which the Department works, I would not remain one hour longer in my present position. I have full confidence that you and all the other bodies which have been given a greater participation than has ever before been afforded to the Irish people in the economic work of Irish government will, when due time has been given, justify the confidence which, at the request of a body mainly Nationalist, was reposed in them by a Conservative Government.

## CALF REARING EXPERIMENTS, THIRD YEAR 1903-4.

Reports on experiments in calf-rearing, conducted in 1901-'2 and 1902-3, have already been published in the Department's *Journal*.\*

A third series of experiments duplicating those instituted in the previous year was commenced at Knockbeg, Collooney, in 1903, the object being to test again the following foods:—

- (i.) Whole milk. (Lot I.)
- (ii.) A mixture, consisting of five volumes of separated milk and one volume of whole milk, approximating in composition to hand-skimmed milk. (Lot II.)
- (iii.) Separated milk and cod liver oil. (Lot III.)
- (iv.) Separated milk and a meal mixture composed of two parts by weight of Indian meal, two parts of oatmeal, and one part of pure ground flax seed. (Lot IV.)

In addition to these respective foods each lot received an equal allowance of pure linseed cake, and all the calves had the run of the same pasture.

The calves were purchased locally between 24th April and 21st May, 1903, and were of the ordinary cross-bred shorthorn type common to the district.

The experiment proper commenced on 23rd May, but during a preliminary period the calves were divided into lots as nearly equal as possible, as regards age and weight, and the food of each lot was then gradually changed in order that the animals might become accustomed to the feeding they were to receive during the course of the first period of the experiment. All the calves were bullocks, and hence all the lots were alike in respect of sex.

The results of experiments with live stock are often greatly influenced by peculiarities of individual animals included in the trials. It is of common knowledge to farmers that one animal will thrive better than another which received exactly the same quantity of the same food, or again that one cow will milk better than another although both are treated alike in every respect. This difference, which is usually ascribed to "individuality," may very seriously impair the reliability of trials conducted with a small number of animals, but the influence of this factor is minimised when a larger number of animals is kept under observation.

\* See *Journal* Vol. III., No. 4 (June, 1903), and Vol. IV., No. 3 (March, 1904)

Hence in these trials a commencement was made with ten calves in each lot. During the complete experiment, which comprised a period of 73 weeks one animal died and four others became, owing to sickness or other causes, unfitted for experimental purposes. The progress of the remaining calves—namely, 10 in Lot I., 9 in Lot II., 7 in Lot III., and 9 in Lot IV.—was carefully recorded during the entire period.

Particulars of the rearing rations fed to each lot, the number of the calves comprising each lot, and also the average age and weight of the calves, are shown in the following table:—

TABLE No. 1.

Lot.	Ration during the first 20 weeks of the experiment— i.e. during the rearing period.*	Approximate average age in weeks when drafted into the Lot and put on experimental feeding, 8th May, 1903.	Total Number of Calves under observation during the entire period of the experiment.	Average weight in lbs. per head when experimental feeding proper commenced, 23rd May, 1903.
I.	Whole Milk, ... ..	4½	10	133·6
II.	Separated Milk and Whole Milk.	5	9	142·5
III.	Separated Milk and Cod Liver Oil	5½	7	145·8
IV.	Separated Milk and Meal Mixture.	5½	9	145·8

\* In addition to these foods each lot received an equal allowance of pure linseed cake.

Table No. 2 gives details of the daily quantities of the various foods used per animal during the first twenty weeks of the experiment up to the time weaning was completed.

TABLE No. 2.

Lot.	Ration.	May 23rd to June 13th.  3 weeks.	June 13th to Sept. 12th.  13 weeks.	Weaning period.	
				Sept. 12th to Sept. 26th.  2 weeks.	Sept. 26th to Oct. 10th.  2 weeks.
I.	Whole Milk, quarts, Pure Linseed Cake, ounces,	6 6	6 8	4 16	2 16
II.	Separated Milk, quarts, Whole Milk, " Pure Linseed Cake, ounces,	5 1 6	5 1 8	3 1 16	1½ 1 16
III.	Separated Milk, quarts, Cod Liver Oil, ounces,* Pure Linseed Cake, "	6 2 6	6 2 8	4 2 16	2 1 16
IV.	Separated Milk, quarts, Meal Mixture, ounces, Pure Linseed Cake, "	6 4 6	6 6 ozs. to July 4th 8 ozs. to Sep. 12th 8	4 8 16	2 4 16

\* The allowance of Cod Liver Oil is expressed in fluid ounces, i.e., 160 oz. = 1 gallon.

The day's ration was given in two feeds—the morning feed from 6.30 a.m. to 8 a.m., and the evening feed from 4.30 p.m. to 6 p.m. The calves were tied whilst feeding in order to ensure that each received its due allowance.

The whole and separated milk was delivered each afternoon from a neighbouring creamery. The evening feed of separated milk was always sweet and warm, but when allowed to stand overnight the separated milk often became sour and thick. The morning feed of milk was prepared by standing the cans containing it in hot water, and was fed at a temperature of from 80° to 90° F. The linseed cake was nudded and the proper allowance added to the milk. The ration of cod liver oil was measured into a bucket and the milk poured over it. As in the previous year, the meal mixture was mixed with sufficient boiling water to make a thick gruel, and allowed to stand for twelve hours before being fed with separated milk.

For two weeks previous to October 10th, when weaning was completed, a small quantity of Indian (maize) meal was given to the calves, a beginning being made with  $\frac{1}{4}$  lb. per head daily. This quantity was soon increased to  $\frac{1}{2}$  lb. per head daily. As a rule no difficulty was experienced in inducing the animals to take their rations.

From May 24th to October 16th, 1903, the calves had the run of a good, well-watered pasture, and were only indoors at feeding time. They were weighed at intervals of four weeks. Table No. 3 shows the average increase in live weight per calf during the first twenty weeks of the experiment.

TABLE No. 3.

Lot	Number of Calves in each Lot.	Ration.	Average Increase in lbs. per head.					
			May 23rd to June 20th.	June 20th to July 18th.	July 18th to August 15th.	August 15th to Sept. 12th.	Sept. 12th to Oct. 10th.	Total Average Increase per head in 20 weeks.
I.,	10	Whole Milk.	49.3	58.6	64.2	64.2	52.0	288.3
II.,	9	Five parts Separated Milk and one part Whole Milk.	47.8	41.7	55.4	62.1	32.7	239.2
III.,	7	Separated Milk and Cod Liver Oil.	41.7	46.0	53.2	65.4	34.7	241.0
IV.,	9	Separated Milk and Meal Mixture	45.1	50.7	59.4	69.6	40.4	265.2

The following notes on the general appearance of each lot, ir-

respective of the weigh-bridge returns, were recorded month by month:—

June 20th.—Lot I. looks better than any other lot. Lots II. and IV. have much the same thriving appearance, but Lot III. has the worst appearance. For some time previous to this date a number of calves in Lot III. have suffered from colds and in consequence have not fed well.

July 18th.—Lot I. has still the best appearance. Lots II. and III. are apparently healthy and thriving, but are not quite so good in appearance as Lot IV.

August 15th.—Lot I. appears in best condition. Lot IV. is thriving well, and is in next best condition to Lot I. Lot II. is in fair thriving condition, and Lot III. has improved, and has now a good silky coat.

September 12th.—Lot I. has the nicest coat, but does not handle much better than many calves belonging to other lots. Lot IV. is now almost as good as Lot I. Lot II. is in good thriving condition, and Lot III. has improved much in appearance during the past four weeks.

October 10th.—The lots are of the same relative appearance as on September 12th.

The above table (No. 3) shows that during the rearing period the calves in Lot I., reared on whole milk, made the largest average increase. Those reared on separated milk and meal mixture (Lot IV.) have made the second highest average gain, which, however, is 23lb. less than that made by Lot I. Lots II. and III., reared respectively on separated and whole milk, and on separated milk and cod liver oil, made about the same progress, but Lot II. is 26lb. and Lot III. 24lb. behind Lot IV., or 49lb. and 47lb. respectively behind Lot I.

The object of the experiments was not, however, to determine which food would give the largest increase in live weight, but which food would give the best financial returns. Hence the increases in weight of the various lots must be considered with regard to the cost of production. This is done in Table No. 4, in which the cost of the various rations has been calculated from the following prices:—Whole milk, 4½d. per gallon; separated milk, 1d. per gallon; cod liver oil, 5s. 6d.\* per gallon;

\* This is an assumed price only, in order to preserve the continuity of comparison. A pure quality of cod liver oil was used in the trials and was purchased at 23s. per gallon, i.e., at a price which renders it too expensive for feeding purposes. Oil of the same quality was bought in 1901 for 4s. 6d., and in 1902 for 5s. 6d. per gallon.

linseed cake, 8s. 9d. per cwt.; oatmeal, 12s. per cwt.; Indian meal, 6s. 0d. per cwt.; crushed flax seed, 17s. 0d. per cwt.

TABLE No. 4.

Lot.	Rearing Ration.	Total cost per calf for 20 weeks.	Cost per week.	Average Increase per head in 20 weeks.	Cost per lb. of live weight increase.	Cost per 100 lbs. of live weight increase.	Cost per 112 lbs. of live weight increase.
		£ s. d.	s. d.	lbs.	d.	£ s. d.	£ s. d.
I.	Whole Milk.	4 1 2	4 0 7	288 3	3 38	1 8 1	1 11 5
II.	Separated and Whole Milk.	1 12 6	1 7 5	239 2	1 63	0 13 7	0 15 2
III.	Separated Milk and Cod Liver Oil.	1 10 5	1 6 2	241 0	1 51	0 12 7	0 14 1
IV.	Separated Milk and Meal Mixture.	1 7 8	1 4 6	265 2	1 25	0 10 5	0 11 8

\* Excluding cost of labour, pasturage, housing, &c.

From the above Table (No. 4) it will readily be seen that the whole milk ration, although producing the largest increase in weight, has, owing to its cost, proved least remunerative of the four rations. One pound of increase in live weight produced by whole milk cost rather more than two and a half times as much as one pound of increase produced by separated milk and meal mixture, which proved the most remunerative ration. The rations of separated milk plus cod liver oil, and separated milk plus whole milk, gave far better returns than whole milk, but, in regard to cost of increase in live weight produced, were somewhat more expensive than separated milk plus meal mixture.

The following Table, No. 5, summarises the results of the experiments conducted in 1901, 1902, and 1903, the figures having reference only to the first twenty weeks (rearing period) of the experiment in each case. From this Table it will be seen that in each year the calves fed on whole milk made the largest increase in weight, but that this gain was obtained at a much larger cost per cwt. than that made by the calves of the remaining lots to which other foods were fed. Although Lot IV., fed on separated milk plus Indian meal in 1901, and separated milk plus meal mixture in 1902 and 1903, does not in each year occupy the same position in respect of gain in live weight—it was third in 1901, second (though only separated by 1½lb. from the third) in 1902, and second in 1903—it has each year given the best financial returns, or, in other words, the gain made by Lot IV. in live weight has been obtained with least expenditure. Lots II. and III., fed respectively on separated milk plus whole milk and separated milk plus cod liver oil, have each year yielded much

more remunerative increases in weight than Lot I. (whole milk), but less remunerative increases than Lot IV. (separated milk plus meal).

TABLE No. 5.

Lot.	Rearing Ration.	Average Increase per head in 20 weeks.			Cost per 112 lbs. live weight Increase.*		
		1901.	1902.	1903.	1901.	1902.	1903.
		Lbs.	Lbs.	Lbs.	£ s. d.	£ s. d.	£ s. d.
I.	Whole Milk,	238.6	291.5	288.3	1 17 3	1 11 2	1 11 5
II.	Separated and Whole Milk,	198.3	254.7	239.2	0 17 11	0 14 3	0 15 2
III.	Separated Milk and Cod Liver Oil	176.2	244.1	241.0	0 19 10	0 14 0	0 14 1
IV.	Separated Milk and Indian Meal (in 1901), and Meal Mixture (in 1902 & 1903).	180.2	256.2	265.2	0 15 11	0 12 1	0 11 8

\* Excluding cost of labour, pasturage, housing, &c.

In 1903, as in previous years, in order to determine the influence of the rearing rations on the development of the animals subsequent to the rearing period, the four lots after being weaned were fed and treated alike. From 10th October, 1903 (when weaning was completed) until 30th April, 1904, each calf was given daily 1lb. pure linseed cake, 1lb. crushed oats, and as much good rye grass and meadow hay as he would eat. During the winter the cake and corn were given in a dry state, but for the first few days these foods were moistened with hot water to encourage the calves to eat them. The above allowance was given in two feeds, and the calves were tied during feeding time morning and evening. The cattle were out daily for water and exercise.

During the winter 1903-4 the weights of the calves were recorded at intervals of eight weeks, and Table No. 6 shows the average increase made by each lot during this period.

TABLE No. 6.

Lot.	Number of Calves in each Lot.	Rearing Ration.	Average weight in lbs. per head on Oct. 10th.	Average Increase per head in lbs.			
				Oct. 10th, 1903, to Dec. 5th 1903. 8 weeks.	Dec. 5th, 1903, to Jan. 30th, 1904. 8 weeks.	Jan. 30th, 1904, to Mar. 28th, 1904. 8 weeks.	Total Increase during 24 weeks.
I.	10	Whole Milk,	421.9	37.0	39.3	40.8	107.1
II.	9	Separated and Whole Milk,	381.7	38.1	19.6	39.2	96.9
III.	7	Separated Milk and Cod Liver Oil,	386.8	35.6	23.4	33.0	92.0
IV.	9	Separated Milk & Meal Mixture	411.0	23.1	27.4	40.5	91.0

The following notes on the appearance of lots were recorded during the winter immediately before the calves were weighed on the dates specified.

5th December, 1903.—Lot I. has, on the whole, the best appearance, and there is no apparent difference in either the condition or appearance of Lots II., III., and IV.

30th January, 1904.—All the lots are strong and thriving, and there is difficulty in making any distinction in respect of their appearance.

26th March, 1904.—Lots I. and IV. look slightly better than Lots II. and III.

Table No. 6 shows that Lot I. (whole milk) made the greatest gain during the winter, and that there is little difference between the increases made by the remaining lots.

On 1st April, 1904, the cattle were moved to Cloonamahon, where good grazing was available. During the month of April they were sheltered in a shed at night and received the daily allowance of 1lb. pure linseed cake and 1lb. crushed oats. The feed of hay was, however, discontinued from 26th April.

The average increase in weight made by each lot, as recorded at intervals of twelve weeks during the spring and summer of 1904 is contained in Table No. 7.

TABLE No. 7.

Lot.	Number of Calves in each Lot.	Rearing Ration.	Average Weight in lbs. per head, on March 26th, 1904.	Average Increase per head in lbs.			Total Increase during 2nd Spring and Summer.
				Mar. 26th, 1904, to June 18th, 1904.	June 18th, 1904, to Sept. 10th, 1904.	Sept. 10th, 1904, to Oct. 11th, 1904.	
				12 weeks.	12 weeks.	5 weeks.	
I.	10	Whole Milk.	529.0	122.1	179.5	63.3	364.9
II.	9	Separated and Whole Milk.	478.6	97.8	168.2	42.2	308.2
III.	7	Separated Milk and Cod Liver Oil.	478.8	118.6	174.3	58.5	351.4
IV.	9	Separated Milk and Meal Mixture.	502.0	108.9	192.8	46.0	345.7

The following notes refer to particulars of the appearance of the various lots during the spring and summer of 1904:—

18th June, 1904.—Only slight differences between the four lots are noticeable, but in respect of condition they may be placed in the following order: Lot I. 1st; Lot III. 2nd; Lot IV. 3rd; and Lot II. last.



10th September, 1904.—Only slight differences are still apparent. The relative position of the lots in respect of condition is identical with that recorded on 18th June.

14th October.—Lots I., III., and IV. are in equally good condition and somewhat superior to Lot II.

It will be seen from Table No. 7 that Lot I. (whole milk) has made the largest and Lot III. (separated milk plus cod liver oil) the second largest increase during the spring and summer. The marked improvement in appearance and condition of calves reared on separated milk and cod liver oil, subsequent to the close of the rearing period, as compared with that of calves reared on other foods has been noted in previous experiments.

The cattle under experiment were sold by tender on October 14th, 1904.

The following Table (No. 8) gives a summary of the progress of each lot during the course of the experiment.

TABLE No. 8.

Lot.	Number of Calves in each Lot.	Rearing Ration.	Average Weight in lbs. per head, on May 23rd, 1903.	Average Gain in lbs. per head.			Average Weight in lbs. per head, Oct. 14th, 1904.	Average Total Gain in lbs. per head during entire Experiment.
				1st Summer, May 23rd to Oct. 10th, 1903. 20 weeks.	1st Winter, Oct. 10th, 1903, to Mar. 26th, 1904. 24 weeks.	2nd Spring and Summer, Mar. 26th, 1904, to Oct. 14th, 1904. 29 weeks.		
I.	10	Whole Milk,	133·6	288·3	107·1	364·9	893·9	760·3
II.	9	Separated and Whole Milk.	142·5	239·2	96·9	308·2	786·8	644·3
III.	7	Separated Milk and Cod Liver Oil	145·8	241·0	92·0	351·4	830·2	684·4
IV.	9	Separated Milk and Meal Mixture.	145·8	265·2	91·0	345·7	847·7	701·9

As regards gains in live weight the relative positions of the four lots are the same at the close of the complete experiment as at the end of the rearing period, Lot I. being first, Lot IV. second, Lot III. third, and Lot II. last. There, is however, a more marked relative difference between Lots II. and III. at the close of the experiment than at the end of the rearing period.

When sold on 14th October, 1904, the cattle were in nice condition and realised the equivalent of 26s. 5½d. per cwt. unfasted live weight. If the loss by fasting be reckoned at the rate of 56lb. per head, this price works out to 28s. 4½d. per cwt. fasted live weight. For the purposes of the following Tables (Nos. 9 and 10) the value

of each lot has been computed at the price at which the animals were sold on the pasture, i.e., 26s. 5½d. per cwt. unfasted live weight.

TABLE No. 9.

Lot.	Average weight in lbs., per head, October 14th, 1904.	Average Value per head.	Difference per head in favour of Lot I.
	lbs.	£ s. d.	£ s. d.
I.	893.9	10 11 0	—
II.	786.8	9 5 9	1 5 3
III.	830.2	9 15 11	0 15 1
IV.	847.7	10 0 1	0 10 11

From the above Table it will be seen that Lot I. is worth on the average from 10s. 11d. to £1 5s. 3d. per head more than the cattle of the other lots. It must, however, be borne in mind that although the four lots were fed and treated alike subsequent to the close of the rearing period, the cost of the rearing rations varied. When comparing the money returns from each lot allowance must therefore be made for the difference in the cost of these rations. This is done in Table No. 10, where a comparison of the net returns from each lot is drawn.

TABLE No. 10.

Lot.	Rearing Ration.	Cost of Rearing per head during the first 20 weeks.	Saving per head effected in respect of feeding as compared with Lot I.	Difference in value per head in favour of Lot I. at close of Experiment.	Nett saving effected per head as compared with Lot I.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
I.	Whole Milk.	4 1 2	—	—	—
II.	Separated and Whole Milk.	1 12 6	2 8 8	1 5 3	1 3 5
III.	Separated Milk and Cod Liver Oil.	1 10 5	2 10 9	0 15 1	1 15 8
IV.	Separated Milk and Meal Mixture.	1 7 8	2 13 6	0 10 11	2 2 7

An inspection of the above Table shows that, as was the case in the previous experiments, the greater increase made during

the complete experiment by the calves reared on whole milk is obtained at too large an outlay to prove as remunerative as other methods of feeding. In the experiments now under consideration the use of separated milk plus meal mixture as the rearing ration proved most remunerative, a saving of £2 2s. 7d. per head as compared with the use of whole milk being effected. The use of cod liver oil in place of the meal mixture was not so remunerative, but gave better returns than the use of the mixture of separated and whole milk.

The results of three calf-rearing experiments conducted by the Department in 1901-3 (Experiment A.), 1902-3, and 1903-4 are summarised in Table No. 11. For the purposes of this Table Experiment B., 1901-3, is omitted, as the calves included therein received milk (i.e., rearing) rations for a period less than twenty weeks, and the various lots comprised only a small number of animals (4 in Lots I., II. and III., 2 in Lot IV.).

TABLE No. 11.

Lot.	Average Gain each Year.	Average Gain for Three Years.	Nett Saving effected per head each year in comparison with Lot I.	Average Nett Saving effected per head for 3 years in com- parison with Lot I.
I.	Lbs.	Lbs.	£ s. d.	£ s. d.
Whole Milk.	1901. 760.6	—	—	—
	1902. 625.9	—	—	—
	1903. 760.3	715	—	—
II.				
Separated and Whole Milk.	1901. 704.5	—	1901. 1 13 3	—
	1902. 531.8	—	1902. 1 6 11	—
	1903. 644.3	626	1903. 1 3 5	1 7 10
III.				
Separated Milk and Cod Liver Oil.	1901. 638.5	—	1901. 1 11 4*	—
	1902. 575.0	—	1902. 1 17 9†	—
	1903. 684.4	652	1903. 1 15 8‡	1 14 11
IV				
Separated Milk and In- dian Meal in 1901, and Meal Mixture in 1902 and 1903.	1901. 709.6	—	1901. 1 18 4	—
	1902. 536.8	—	1902. 1 14 9	—
	1903. 701.9	649	1903. 2 2 7	1 18 7

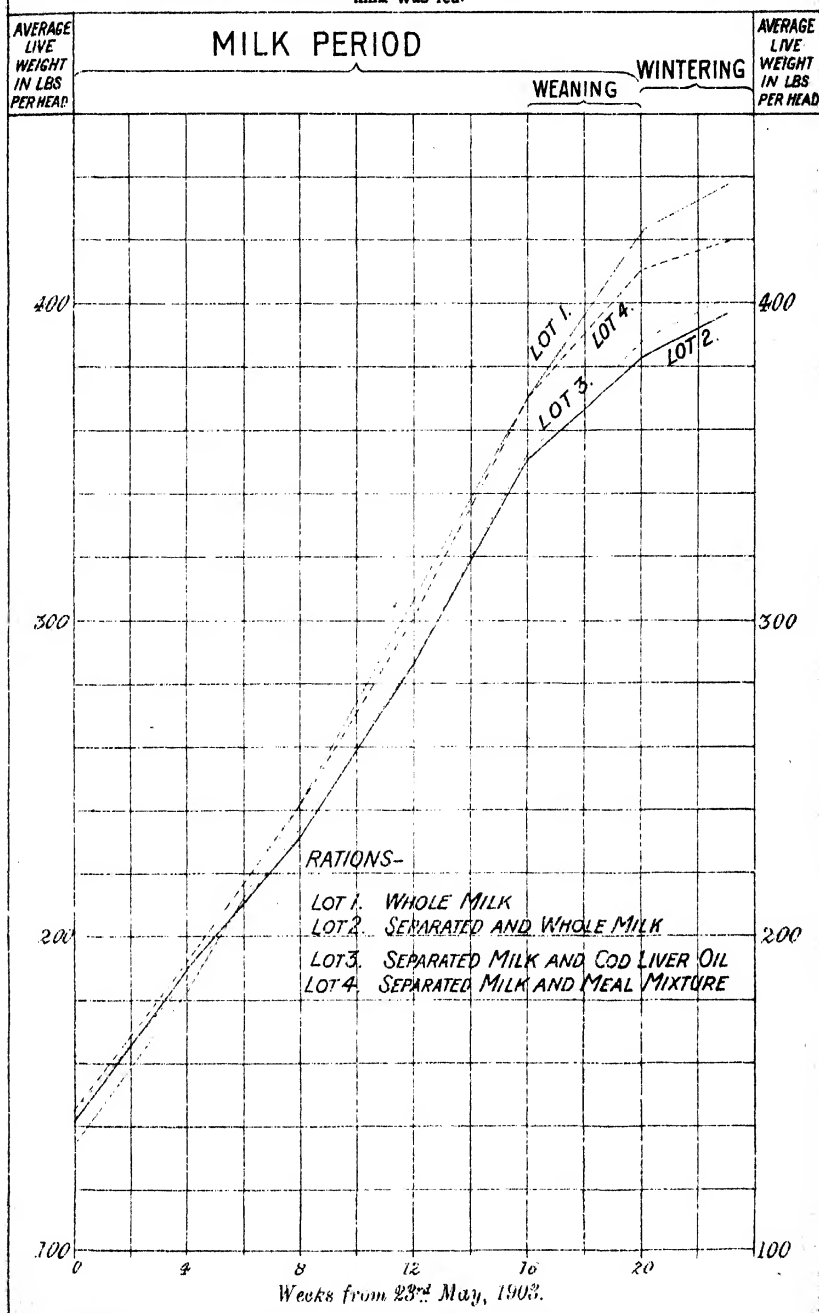
\* Cod liver oil 4s. 3d. per gallon.

† " " " 5s. 6d. "

‡ " " " calculated at 5s. 6d. per gallon

# CALF REARING EXPERIMENTS, 1903.

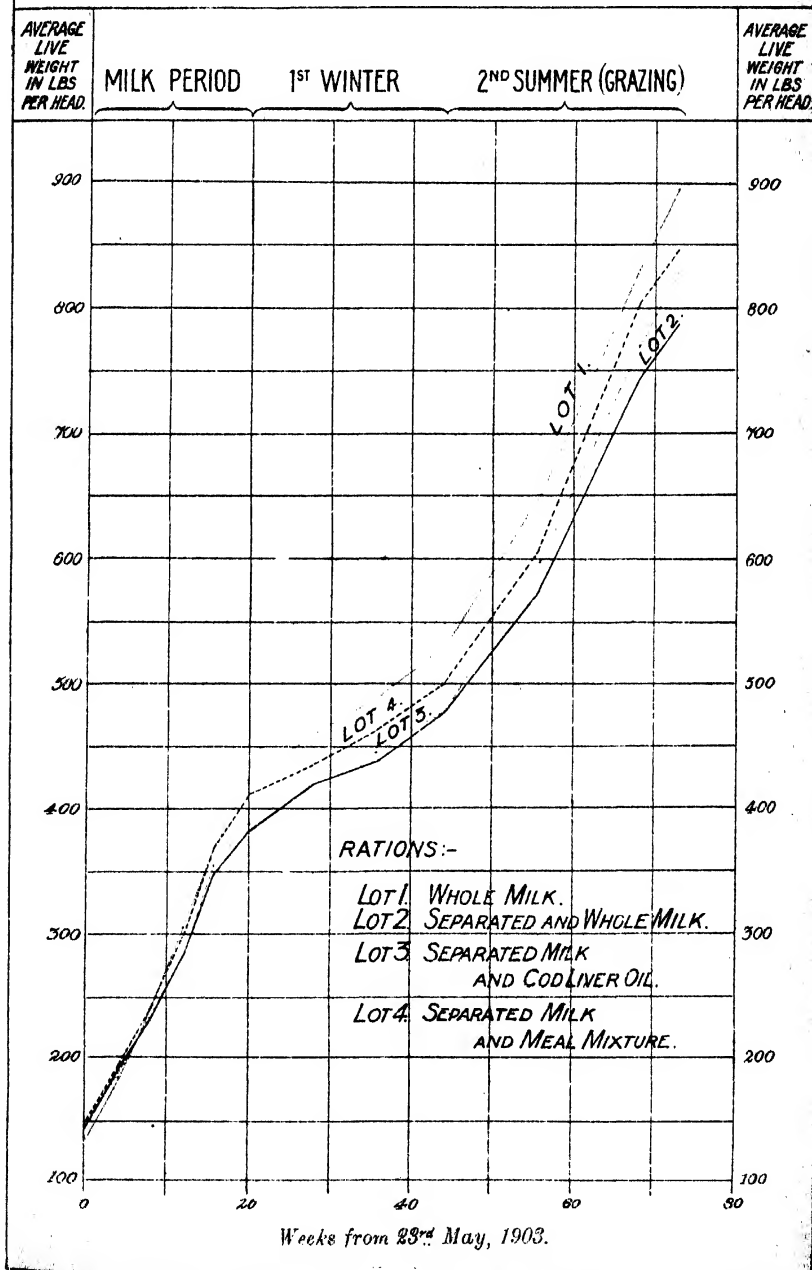
Figure 1. Showing graphically the development of each lot of calves during the time milk was fed.





# CALF REARING EXPERIMENTS, 1903.

Figure 2. Showing graphically the development of each lot of calves during the course of the experiment.





The cattle reared in 1901 were under observation for 87 weeks, and those reared in 1902 and 1903 for 73 weeks. From the results of the three experiments, as summarised in Table 11, it will be seen that

(i.) Each year the calves reared on whole milk have made the largest increase in live weight, but that this food was invariably the least economical.

(ii.) That in two experiments Lot IV. (reared on separated milk and Indian meal, or on separated milk and a meal mixture) has made the second largest average increase per head, and in the same experiments given the most remunerative returns.

(iii.) That in two years Lot III. (cod liver oil and separated milk) gave rather less remunerative returns than Lot IV. (separated milk and Indian meal, or separated milk and meal mixture), but in another year gave better financial returns than the latter.

(iv.) That a mixture of separated and whole milk has in two years proved less remunerative than separated milk and cod liver oil, and in each year less economical than separated milk and meal (as fed to Lot IV.).

These experiments, therefore, indicate that, compared with whole milk, calves may be more economically reared on separated milk plus a cream substitute such as cod liver oil or Indian meal, or a mixture of Indian meal, oatmeal and crushed flax. If the average increases obtained in the three experiments from cod liver oil and whole milk be compared, equal financial results are obtained when the prices of these two commodities are 22s. 9d. and 4½d. per gallon respectively. One cannot, of course, as a rule, afford to rear calves for a long period on whole milk, neither can one afford to use cod liver oil unless its price is much lower than that just indicated. If the relative values of cod liver oil and meal mixture be now compared in the light of the three experiments, due regard being paid not only to the progress of the cattle during the rearing period but also to their after development, it will be found that when the meal mixture can be prepared for 10s. 6d. per cwt. or less, it is to be preferred to cod liver oil, unless it can be bought under 5s. per gallon. There is now, however, difficulty in obtaining pure cod liver oil at a price of 4s. 6d. to 5s. 6d. per gallon, and, pending the



results of further trials, the Department would, therefore, advise farmers to rear calves on separated milk and a mixture of two parts by weight of oatmeal, two parts by weight of Indian meal, and one part by weight of crushed flax seed, supplemented by a little linseed cake. This ration may be given in the same quantities as are indicated in Table No. 2 of this report.

In the following appendix will be found the weights of the individual calves reared during 1903-4.

## APPENDIX.

TABLE showing the weights of the individual calves at various dates during the course of the Experiments.

## LOT I.

No of Calf.	Sex.	Weight in lbs.				Total increase in lbs. during course of experiment. 73 weeks.
		1903. May 23 <sup>d</sup> .	1903. Oct. 10 <sup>th</sup> , 20 weeks.	1904. Mar. 26 <sup>th</sup> , 24 weeks.	1904. Oct. 14 <sup>th</sup> , 29 weeks.	
1	Bullock, . .	168	472	584	964	796
2	" . .	168	422	520	864	686
3	" . .	119	406	453	852	733
4	" . .	114	402	524	844	730
5	" . .	123	403	522	896	773
6	" . .	127	420	532	924	797
7	" . .	130	429	526	886	756
8	" . .	93	388	461	822	729
9	" . .	129	407	550	924	795
10	" . .	165	470	588	973	808

## LOT II.

11	Bullock, . .	171	413	504	806	635
13	" . .	125	369	454	773	647
14	" . .	146	407	476	820	674
15	" . .	147	440	530	870	723
16	" . .	135	336	440	742	607
17	" . .	101	340	430	684	583
18	" . .	103	264	360	635	532
19	" . .	144	366	502	835	691
20	" . .	210	511	612	917	

TABLE showing the weights of the individual calves at various dates during the course of the Experiments.

Lot III.

21	Bullock, . . .	172	403	510	910	738
24	" . . .	124	379	474	840	716
25	" . . .	137	397	504	848	711
27	" . . .	103	326	388	714	611
28	" . . .	106	308	400	760	654
29	" . . .	186	468	576	900	714
30	" . . .	193	427	500	840	647

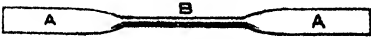
Lot IV.

No. of Calf.	Sex.	Weight in lbs.				Total increase in lbs. during course of experiment, 73 weeks.
		1902, May 23rd.	1903, Oct. 10th, 20 weeks.	1904, Mar. 26th, 24 weeks.	1904, Oct. 14th, 29 weeks.	
31	Bullock, . . .	178	480	551	866	688
32	" . . .	176	462	514	892	716
36	" . . .	126	391	472	828	702
35	" . . .	110	392	464	784	674
36	" . . .	100	306	410	812	712
37	" . . .	168	436	536	846	678
38	" . . .	134	405	548	910	776
39	" . . .	163	374	472	824	671
40	" . . .	168	454	552	868	700

## SWEDE LEAF-SPOT.

One very useful piece of work carried out by the Department's Agricultural Instructors is the unearthing of the presence of diseases in farm crops in different parts of Ireland. In the pages of this *Journal*, from time to time, reference has been made to the many diseases to which members of the genus *Brassica*—the swede, rape, turnip, and cabbage—are subject. Such diseases as finger-and-toe, white rust, bacterial rot, and the *Phoma* disease are now, when not previously, well-known to be widely prevalent in the country.

**Occurrence in Ireland.** On my return from vacation last autumn I found waiting for me diseased specimens of swede, the leaves of which reminded one of the leaf-spot disease of the mangel or beet, and the disease may be conveniently called Swede Leaf Spot. Mr. Logan, Agricultural Instructor in County Sligo, reported that the leaf-spot trouble was present in many of the swede crops in his district, and that in one large field which, in the middle of July gave every promise of a fine crop, the disease had made such ravages that the yield of root was, in the end, lessened at least 40 per cent. Soon after these specimens from Mr. Logan had come to hand, others were received from Counties Donegal, Galway, Kerry, and Queen's County. Everything tended to show that the disease was causing considerable loss.\*

The appearance presented by a diseased leaf  
**General character.** is well indicated in the accompanying coloured illustration and reproduction of a photograph (Figs. 1 and 2). The spots appear first on a leaf as small roundish patches of different sizes, the substance of the leaf-spot loses its green colour, becomes yellow, or almost white, dries up and may even disappear altogether, leaving a hole in the substance of the leaf. The whole leaf may lose its green colour, turn yellow and fall off. Where this occurs to any large extent, there is a natural loss in working power of the swede plant; the resulting fleshy 'roots' remain smaller than normal, and the whole crop is thus reduced in yield. A microscopical examination of the diseased spot shows that the leaf is bored through and through by delicate branching jointed fungal threads which run between and through the cells of the leaf, destroying their substance and green grains, and reducing the leaf at the diseased spot to a shrivelled-up membrane. A cross section through an attacked leaf looks so  where (A) is the healthy tissue, and (B) is the collapsed tissue of the leaf-spot. Not only does

\* I gave a preliminary account of the swede trouble in a paper read before the Royal Dublin Society in November, 1904.



FIG. 1.—SWEDEN LEAF SPOT.

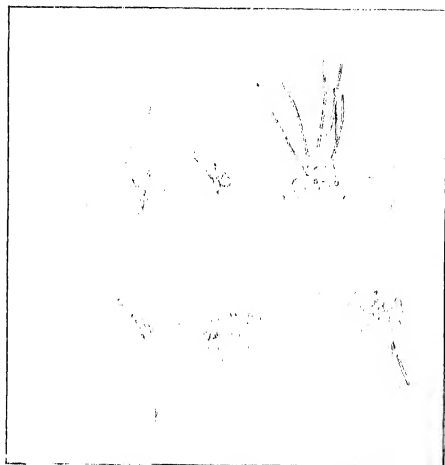


# SWEDE LEAF-SPOT.

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FIG. 2.—Swede leaf-spot.



R. H. del.

FIG. 3.—Cross-section of leaf through leaf-spot, showing tufts of projecting conidia. Enlarged.

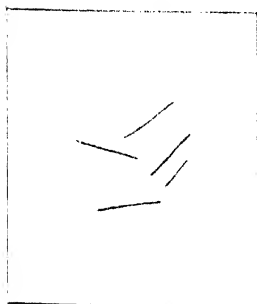


FIG. 4.—Leaf-spot conidia free. Much enlarged.



FIG. 5.—Swede leaf-spot, showing sclerotia. (Microphotograph.)

# SWEDE LEAF-SPOT.



FIG. 6.—Cross section of leaf-spot, showing (S.) sclerotium and (P.) pycnidium? (Microphotograph.)



FIG. 7.—Cross section swede midrib showing *Phoma* pycnidia.

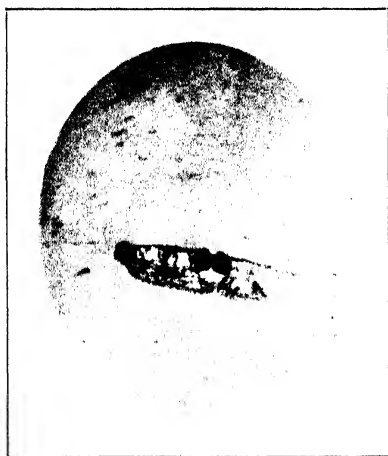
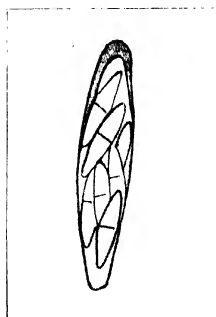


FIG. 8.—Cross-section of rape leaf, showing perithecia of *Sphaerella Brassicae*.



J. A. del.

FIG. 9.—Asci of *Sphaerella Brassicae*, showing jointed ascospores. ( $\times 857$ .)

th fungus pest permeate the substance of the body of the leaf, destroying it, but it sends out, at the surface of the leaf, singly or in tufts, through the leaf air-pores or stomata, and also independently of them, rod-like jointed threads (Figs. 3, 4). These are the septate conidia which fall off from their point of attachment, and germinate readily. If they fall on another leaf of the same swede plant, or on the leaf of another swede plant, to which they may be carried by the wind or other cause, they sprout, work their way into the swede leaf, and destroy it there more or less completely, forming leaf-spots as just described. By this means a whole field may become diseased, as occurred in cases last year. The fungus causing this trouble is known as *Cercospora Bloxami*, B. et Bk. The name was first given to a fungus found by the Rev. J. M. Berkeley on some decaying leaves of turnip sent him in 1882 by the Rev. A. Bloxam. The fungus has since been found in Germany and Switzerland where, however, it is said by Kirchner to do little harm. It has also been found in England on charlock, a very well-known weed of too frequent occurrence. It appears as if, at any rate in the West of Ireland, the fungus was more virulent than on the Continent, possibly owing to a predisposition of the swede crop induced by the moister climate. Mr. Logan found that the outer older leaves of the swede plant suffered most from the attack, and that as the open weather of October and the early part of November of last year continued, the swedes shook off the disease and as far as could be expected, largely recovered from the attack. On looking up turnip material that I had received from Mr. Wade, of County Kildare, in 1903, I found that the turnips which were suffering markedly from *Oidium balsami* showed also the presence of *Cercospora Bloxami*, so that 1904 was not the first year of the occurrence of this fungus in Ireland. On examining the swede leaf-spot further, I noticed, if my observations are reliable, features which are not given in the published accounts of *C. Bloxami*, and yet are of considerable significance. In a great many of the leaf-spots of plants not only from County Sligo, but from other parts of Ireland, including specimens on exhibition at the Winter Show of the Royal Dublin Society in December, 1904, I found numerous dot-like black specks (Fig. 5). Under the

microscope these appear as solid heaps of small round, dark-walled cells, rich in stored food-material. They have every appearance of being what are known as sclerotia, *i.e.*, bodies capable of resisting the rigours of the winter, and of sprouting in the following spring. Such bodies, when present as a stage in any disease, are very



effective means, from the disease point of view, of continuing the attack in the following season. They are a chief cause of the persistence of "Yellow Blight" in the potato crop, and of certain clover, onion and other bulb diseases.

Early in December last a number of seedlings of swede, turnip and rape were inoculated under sterilisation conditions. In the course of a few weeks disease spots like those in the field crops appeared; microscopic examination showed the destructive work of the fungus threads in the substance of the leaf, projecting conidia were observable and in addition these dark sclerotium-like bodies. There is thus every indication that they form an integral feature of the life-history of the leaf-spot fungus.

In certain of the leaves examined some of these black bodies had changed from being solid and had become hollow (Fig. 6).

**Phoma disease.** They are apparently capable in some cases, as in certain other fungi, of becoming reproductive bodies either of the nature of spermogonia, pycnidia, or of perithecia. Neither in the artificially infected nor in the field material did I get clear and continuous indications of the gradual conversion of any of these sclerotium-like bodies into a fully formed pycnidium or perithecium, but on some specimens of swedes, rape, etc., affected by the leaf-spot disease I found well-developed pycnidia showing all the characters of a true *Phoma* allied to, if not identical with, the form known as *Phoma Brassicae*, fig. 7. Further in some rape material showing leaf-spot some of the patches, more especially those near the midrib, showed true perithecia, examination of which indicated that the fungus was a *Sphaerella*, figs. 8 and 9. Two species of the genus—*Sphaerella napicola* and *Sphaerella brassicicola*—are known to occur on forms of *Brassica*. My first impression, on reading the description of *Sphaerella napicola*, Fautrey, in Saccardo's Sylloge Fungorum (IX., p. 617) was that this was the fungus I had before me. On comparing the measurements and other points in detail I decided that the two were not identical and that the *Sphaerella* did not agree with any species described in Saccardo's Sylloge and should be treated as a new species—*Sphaerella Brassicae*—with the following diagnosis:—*Sphaerella Brassicae*, n. sp.

Maculis magnis indeterminatis; peritheciis numerosis, in maculis gregariis rotundatis, nigris, papillatis,  $61\mu$  latitudine; ascis subclavatis, apice crasso,  $42 \times 9\mu$ , paraphysatis; sporidiis (ascosporis)  $12-13 \times 2-3\mu$ , hyalinis, 1 septatis, fusiformis, loculis aequalibus,

Hab. in foliis languiscentibus *Brassicae* in Irlanda.

It would be going too far to conclude because on diseased swedes or rapes or turnips the *Cercospora* fungus is found in presence of a *Phoma* and a *Sphaerella* that these three forms belong to and are simply stages in one and the same species. Cultures only, under the usual conditions, can settle the question. All that one can say at present is that there is much to indicate that *Cercospora* has, in addition to the stage described and causing the leaf-spot, in all probability a *Phoma* stage which may prove to be associated with *Phoma Brassicae* and another stage *Sphaerella Brassicae*. There is in the swede leaf-spot disease a close parallelism between it and the leaf-spot disease worked out by the late Dr. Berlèse in the Spanish Chestnut. In this case Berlèse proved by cultures that the Spanish Chestnut leaf-spot is due to a fungus closely allied to *Cercospora* and at one time called *Cercospora*, now known as *Cylindrosporium castaniculum*. This stage of the fungus is followed by a *Phoma* stage called *Phyllosticta maculiformis*, closely allied to *Phoma brassicae*, and this stage is followed by a third, the ascospore stage called *Sphaerella maculiformis*, closely allied to the *Sphaerella* just described as occurring in diseased rape.

While consulting Saccardo's invaluable *Sylloge Fungorum* for descriptions of forms bearing on the swede disease I noticed with interest that in Vol. IX. *Sphaerella napicola*, Fautrey, is described as occurring at 'Noitan, Côte-d'or, Galliae,' on *Brassica napus*, var. *oleifera*, and in Vol. X. *Cylindrosporium brassicae* is described as occurring in the same place on *Brassica Napo-brassicae*. This coincidence seems to me to lend support to the possibility that the *Cylindrosporium* is the conidial stage of the *Sphaerella*. It is characteristic of the genus *Cercospora* that it possesses either coloured conidia or threads and that its conidia are generally tailed. *Cercospora Bloxami* shows neither feature, and is better described as *Cercosporella Bloxami*, as in *Cercosporella* fungal threads and conidia are hyaline and the conidia are jointed, rod-like.

From the practical point of view the matter is of importance. If *Sphaerella* is the final stage in the swede leaf-spot disease then the ascospores are an additional means of enabling the fungus to hibernate and to perpetuate itself in the succeeding season.

The disease and season were so far advanced last year when attention was called to the trouble that no experiments in combating the attack could be made. Many cultivated and other plants have suffered, generally to a slight extent only, from leaf-spot caused by species of *Cercospora* or allied genera, and in some cases information is available as to preventives.

Thus in some cultivated species of *Prunus* (the Plum genus) ammoniacal solution of copper carbonate was found to lessen the loss of leaves from leaf-spot. Quite recently Lagerheim and Wagner have described a potato leaf-spot due to *Cercospora concors* (Casp.) Sarc., as increasing in extent in Sweden and on the Continent, and as likely to become a dangerous parasite. In this case spraying with Bordeaux Mixture is recommended for trial. Should the swede leaf-spot be as prevalent in Ireland this season as last it is intended to carry out preventive experiments by spraying. The plucking off and burning of the spotted leaves as they appear would tend to hinder the disease from spreading, but this is obviously an impossible measure in a field of many acres. Another step one might take is to have such a rotation that swedes are for several years not grown in a field where a leaf-spot crop has previously occurred. If, as seems the case, excess of water is a favouring cause of the appearance of the disease, attention should be given to drainage, and care taken in the selection of suitable soil, where possible. Weeds, too, as they may harbour the fungus, should be kept down.

### SUMMARY.

1. The swede crops in different parts of Ireland, but especially in the West, in 1904, suffered severely from leaf-spot due to *Cercospora* (*Cercospora*) *Bloxami*, a fungus found on the Continent, too, where, however, it does little harm.

2. The swede leaves show discoloured patches, turn yellow, and fall off before their work is done.

3. The leaf-spots give tufts of jointed conidia or spores, which are easily set free, and carry the disease to other swedes in the same and neighbouring fields.

4. On older leaf-spots black specks appear, which directly or indirectly serve to carry the parasite through the winter and enable it to attack next year's swede crop.

5. The pest is found also on turnip, rape, cabbage, and on the weed charlock.

6. Nothing is known as yet as to a suitable fungicide. Swedes should not follow swedes too soon in the rotation, in fields where leaf-spot has occurred. The soil selected should have as good drainage as possible, as excess of water seems a predisposing cause of attack.

T. JOHNSON,

## THE EARNINGS OF IRISH MIGRATORY LABOURERS IN ENGLAND AND SCOTLAND, SEASON 1904.

In view of the statement that the wages earned by migratory labourers in 1904 was much less than in previous years, an exhaustive inquiry has been made as to the facts both in England and Scotland.

### I. SCOTLAND.

More than half of the labourers who go to Scotland find employment at potato raising, and are away from their homes for a period of four to four and a half months. They are drawn chiefly from West Mayo, particularly the Island of Achill, and are composed largely of older men, girls and lads who are able to engage in the lighter work of potato picking. The stronger and more able-bodied men from the same district go to England, where they get heavier work and are better paid.

So far as the potato worker is concerned there does not appear to be any ground for asserting that in the past season they have earned less than usual.

Compared with the previous year—1903, which was, however, abnormal—the earnings, in some cases, have no doubt, fallen short, but employers who pay three-quarters of the wages state that 1904 was equal even to 1903 in respect of actual earnings, and was better than 1903

**Earnings in  
1903 and 1904  
contrasted.**

in respect of the labourers being able to return home a fortnight earlier. Other merchants say that 1904 earnings were about 10 per cent. short of 1903, but were fully equal to the six previous years.

The labourers who go to Scotland and who are engaged in agricultural work other than potato raising are men drawn chiefly from Donegal. These find their way to the Lothians, Perth, Fife, Forfar, Berwickshire, and other large tillage districts. Most of them go to districts where they have been before, and many have been for a series of years

with the same employer. In such cases the wages are found to have been almost identical with last year. Of the Irish migratory labourers who go to Scotland there appear to have suffered in the matter of earnings only those who do not care to settle, but prefer to itinerate, seeking emergency labour at high wages—travelling from earlier districts to later in search of two or three harvests. Such labourers appear to have suffered considerably owing to the exceedingly fine season and the shortness of the hay harvests as well as the time between the earlier and later harvests.

**Potato-Raisers:  
their Work and  
Wages.**

The potato raisers are generally employed by potato merchants, who sometimes find employment for 100 to 150 throughout the whole season. The merchants have a number of foremen, or "gaffers" as they are called, who are themselves Achill men, and who collect the labourers and are employed supervising their work. They also take a general surveillance of their behaviour, and are responsible for their good conduct. The labourers work in squads of twenty to thirty, and are paid in pairs. Thus, two girls alternately digging and picking would receive 5s. per day as their joint wage. Young boys, who are unable to dig, generally pick for the father or some male relative who is strong enough to dig the whole day. In this case the earnings also are 5s. for the pair. The "gaffers" get various wages, ranging from 25s. to 35s. per week, and their time is "upstanding." Barrel men, that is men who pack and load the barrels, receive 21s. per week; riddlers 20s. per week, and the time of those men is also "upstanding." They have no broken days in wet weather. The others are only paid when working, and not infrequently are disturbed by wet weather and sometimes by bad markets. On the whole, however, they had little of either interference during the past season, and so far as one can ascertain the point, the wages earned in money average £19 to £20 each for the season of four and a half months. In addition to the cash wages, they get housing, bedding, coals, potatoes, and sometimes a little milk, so that they have only their groceries to buy, and where they are living in groups or in families it is estimated that 4s. per week each covers this. Allowing for other sundry expenses the average net earnings which each labourer after a season of four and a half months at potato raising would take back to Ireland may be estimated at about £12 for the season. Fares from Westport are paid by the labourers, the steerage passage costing 5s. Employers pay all railway fares beyond Glasgow.

The men who go for general farm work to the tillage districts in

**Other Harvesters  
in Scotland.**

Scotland are paid in various ways. They also get housing and the usual perquisites, and 16s. per week when working on day wages is an average earnings. At some operations, however, they receive piecework and for a short time may earn 25s. to 35s. During the corn harvest they receive 16s. a week and a bonus, for the time, of £2, so that on the whole the wages earned by such men would approach nearly 20s. per week, with no broken time.

## II. ENGLAND.

Women and boys do not go to England—only able-bodied men.

**The Position  
of the Harvester  
in England and  
Scotland contrasted.**

The scale of remuneration there varies much more than it does in Scotland. Those who go to farms in the neighbourhood of large towns and cities receive a higher scale of payment according as the general wages of the district are higher. Also, there is more itinerating in search of work, and consequently more loss for that reason than has occurred in Scotland. Further, in England most of the Irish labourers have their regular routes; many of them go to the same employer year after year, and where this is the case they have earned good wages; some are still remaining in England on the farms.

I have been allowed access to the books of several extensive farms in England. In one case in Cheshire, where twenty-two men were employed, the men arrived on March 11 and left on October 28th, having thus had thirty-two full weeks' work; 18s. per week was the regular wage when working on days'

**Wages in England.**

wages; they were also allowed houses, bedding, fuel, potatoes, milk, and lighting, but no fares were paid. In England the Irish labourers get more piecework, and some weeks their earnings run up as high as 35s. per week, and the total earnings for the thirty-two weeks on the Cheshire farm was £34 4s. 9d. each, equal to 21s. 4d. per week. On a large farm in Staffordshire, close to Birmingham, the wages paid were considerably in excess of the Cheshire instance, but the season was very much shorter, beginning in June and ending in the middle of October. In this case as much as £3

per week was sometimes earned during the potato harvest, the raising being done by piece-work. The gross earnings for twenty weeks averaged £24 per man. On this farm there were also employed many Irish labourers who earned large wages for only two or three weeks. These men had been wandering over the country, sometimes getting work at high wages, but oftener being quite idle, so that they would have a poor revenue compared with those who had settled down.

These two instances, being close to the large cities of Birmingham and Manchester, probably represent the maximum wage paid in England. In other parts—Warwickshire, Lincoln, Yorkshire—the earnings more closely resemble the amounts paid to the Scottish men labourers, and on the whole reach about 20s. per week. From various other districts in England, however, the reports are forthcoming that large numbers of men were unemployed for a considerable portion of the season owing to the slackness of local industries, especially the building trade, which relieved a great number of unskilled labourers. These, to a large extent, filled the places which Irishmen formerly occupied. It is impossible to arrive at any near estimate as to how many suffered from this cause, but it is apparent that the number was large.

The migratory Irish labourer is extremely useful to the English and Scotch farmers, and could ill be done without. I have myself had a long personal experience of this class of labourer, having employed from twenty to forty annually for the last fifteen years. They serve a purpose for emergency work, and are paid emergency wages, and when they come in

**The Irish  
Harvestman in the  
English and Scotch  
Agricultural  
Economy.**

families they are able to save a considerable amount. One man who has come to me for eight years consecutively along with three girls, his children, has been able to maintain the company in Scotland and return with £40 to £42 in cash. As regards physique and condition many of the labourers on arrival appear pale and thin and ill-nourished, but they improve greatly during their stay in Scotland, a change due to the spring and summer work, and to the more ample dietary which is needful if they are to accomplish the day's task. They also purchase clothing in Scotland, and return home

much better off in this respect than when they arrived. The wages of the Irish migratory labourer have been increased gradually during the last six years, and of late there has been a disposition to be less provident than formerly. I do not mean that any money is spent in a vicious

### **The Character of the Workers.**

way, but probably in the purchase of things that are not actually necessary. The girls like to return to Ireland in a tailor-made jacket and a hat with a feather in it. Otherwise they are saving and industrious, the money being remitted regularly to Ireland at the end of the week or fortnight. Their conduct is excellent.

Very rarely do the men drink and the girls are patterns of modesty and good behaviour. As a rule they come in families, or perhaps one elderly man may have charge of one or two girls of his own and as many of a neighbour as could come. They work practically a ten-hour day, with ten minutes' rest at each quarter. Probably the healthiest of

### **Their Work and Manner of Living.**

the people come, and there is nothing in their appearance to indicate anything like physical degeneration. It is very seldom

one sees an anæmic girl, and the young men, after they have been a few weeks in the country and have been well fed, are quite up to the standard of ordinary Scotch agricultural labourer. Indeed it is not an uncommon thing to find that the young Irishman will altogether out-do the Scottish labourer in the matter of racing and other sports in which they engage. In Scotland the food which they eat is a fairly good dietary for the labouring class. They are allowed by the farmer to take all the potatoes they can use, and potatoes, along with fish, eggs, &c., usually constitute the evening meal when work is over. The morning meal consists of tea, and bread and butter, with cheese and tinned meats. For their mid-day meal, which is brought with them to the field, they have sandwiches made of bread and butter and ham, and generally cold tea—never beer or spirits. In England the dietary is even more generous, as they are usually in small companies, occupy a properly equipped cottage, and can consequently cook their food better. Fried bacon is a staple food.

As regards sleeping accommodation, from time to time one hears of the hardships that Irish girls have to endure in Scotland while engaged at their work. But of later years there has been a great improvement in this respect. The sanitary officers of the



various counties see to it that nothing is permitted that would be injurious to their health. As it happens, however, on some of the Ayrshire farms very large extents of potatoes are grown, and these are sold to, perhaps, as many as half a dozen merchants, each of whom bring large squads of Irish potato workers, clearing off the whole acreage in two or three weeks. Consequently the accommodation that the farmer can provide is severely taxed for that short period, cow-sheds and other outhouses being used, but all are made as clean as it is possible in the circumstances to make them. The workers are not exposed to any cold, as while they are at these places it is the very height of summer. What appears to be the greatest hardship they have to endure is the absence of inside fire-places at which in wet weather the workers may dry their clothes. The cooking is generally done outside at a large coal fire, and it seems to serve that purpose perfectly well, but when girls come in from their work drenched with rain there is no way of drying the garments properly. This hardship, however, is one which the farmers are at present endeavouring to relieve. A good many of the largest farmers have put up specially constructed timber or galvanised iron houses for the express purpose of lodging these temporary workers, and I scarcely think that there is much room now for serious complaint.

M. G. WALLACE.

## FLAX EXPERIMENTS, 1904.

As a result of the flax field experiments of seasons 1901, 1902 and 1903\* some slight changes were made in the series carried out in the summer of 1904.

### I. MANURIAL EXPERIMENTS.

The general plan of the manurial experiments, which have now been in operation for three years, was adhered to in 1904, but as the supplemental plots treated with salt, rape meal, and basic slag, which were introduced into the scheme in 1902, gave bad returns, the use of these manures was discontinued. On the other hand, two potassic manures, viz., kainit and muriate of potash, gave good returns in previous years, and hence a plot treated with another potassic manure—sulphate of potash—was included in the 1904 experiments which, therefore, comprised trials of the following manures:—Kainit, muriate of potash, sulphate of potash, a mixture of superphosphate and kainit, and, lastly, a mixture of sulphate of ammonia, superphosphate, and kainit.

These tests were conducted on ten farms in counties Londonderry, Antrim, and Down. The dressing of muriate of potash was increased from  $1\frac{1}{4}$  cwts. to  $1\frac{1}{2}$  cwts. per statute acre, and the other manures were applied in the same quantities as were given to the corresponding plots in the previous year. On the supplemental plot  $1\frac{1}{2}$  cwt. of sulphate of potash per statute acre was applied, this quantity containing an amount of potash approximate to that supplied in the form of kainit and muriate of potash. Full details as to the treatment of each plot, and the results from each centre, are shown in Table II. (pages 454–455), and in order to facilitate reference to the results of the experiments conducted during the previous three years a summary is given in Table I. (page 451).

In the spring of 1904 the preparation of the land for the flax crop was carried out under favourable climatic conditions, and suitable seed beds were generally obtained. Sowing, however, was delayed at some centres, owing to the rain which fell at frequent intervals during the period from 21st April to 10th May.

At each of the ten centres there were six plots (see Table II.), each one-tenth statute acre in extent. The plots were measured and the seed and manures sown under the supervision of an inspector. As in previous years, the seeding was at the rate of sixty-two quarts per statute acre. The produce of each plot was purchased outright, retted

\* See Journal, Vol. II., pp. 636, *et seq.*, Vol. III., pp. 663, *et seq.*, and Vol. IV., pp. 616, *et seq.*

under the Department's supervision, and afterwards sent to the Department's mill at Carthall, Coleraine, to be scutched, and the scutched flax valued in Belfast by a small committee appointed by the Flax Spinners' Association.

The season of 1904, unlike that of the two previous years, was on the whole favourable to the growth of flax, although heavy rain in August interfered with the pulling of the crop, and, to some extent, damaged the flax. The rainfall recorded at Coleraine (County Derry) during the years 1903 and 1904 is shown in the following table:—

—	Rainfall in Inches.											
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1903.												
Rainfall up to	5·89	3·30	4·82	1·76	2·61	0·94	4·35	4·91	3·81	6·90	3·52	2·77
end of	5·89	9·19	14·01	15·77	18·38	19·32	23·67	28·58	32·39	39·29	42·81	45·58
1904.												
Rainfall up to	4·50	2·96	1·86	2·52	2·60	0·15	2·47	6·41	2·96	2·45	4·98	3·11
end of	4·50	7·46	9·32	11·84	14·44	14·59	17·06	23·47	26·43	28·88	33·86	36·97

The following statement shows the dates of sowing and pulling of the flax:—

CENTRE.	Date of Sowing.	Date of Pulling.
	1904.	1904.
Dromara, . . . . .	10th May.	20th August.
Dunboe, . . . . .	9th "	12th and 13th August.
Castleroe, . . . . .	10th "	13th August.
Masterague, . . . . .	29th April.	17th "
Moneygobbin, . . . . .	4th May.	6th "
Ballywilliam, . . . . .	9th "	18th "
Macosquin, . . . . .	21st April.	3rd and 4th August.
Drumaquill, . . . . .	26th "	8th August.
Articlave, . . . . .	9th May.	12th "
Balleney, . . . . .	25th April.	10th "

The following notes on the appearance of the plots were made during the summer of 1904:—

- (i.) With the exception of those to which potassic manures were applied all plots "yellowed" to some extent.
- (ii.) The plots treated with kainit, muriate of potash and sulphate of potash had the best appearance from the time of brairding to the date of pulling.
- (iii.) The crop on plots to which superphosphate was applied was strong and healthy in the early stages of growth. At most centres there was, however, on these plots a strong growth of weeds, such as spurry, charlock and red shank, which resulted in the choking of the flax.

Exactly similar general observations on the growing crop were made in previous years.

**TABLE I.**—Showing estimated **PROFIT** or **LOSS** per Statute Acre due to the use of **MANURES** applied to the **FLAX CROP** in 1901, 1902, 1903, and 1904.

Manure.	Quantity per Statute Acre.	1901.	1902.	1903.	1904.
Kainit	{ In 1901 5 cwt. In other years 6 cwt.	9s. 3d. profit.	16s. 3d. loss.	7s. 3d. profit.	7s. 4d. profit.
Muriate of Potash	{ In 1901 1 cwt. In 1902 & '03 1½ cwt. In 1904 1½ cwt.	£1 6s. 0d. profit.	4s. 2d. loss.	17s. 1d. profit.	1s. profit.
Sulphate of Potash	1½ cwt.	-	-	-	13s. 2d. profit.
Salt, . .	4 cwt.	-	£1 9s. 3d. loss.	2s. 9d. loss.	-
Kainit and Superphosphate.	3 cwt. of each.	£1 9s. 7d. loss.	£1 4s. 6½d. loss.	11s. 7d. loss.	14s. 6d. loss.
Kainit, Superphosphate, and Sulphate of Ammonia.	{ 3 cwt. each of Kainit & Superphosphate, ½ cwt. of Sulphate of Ammonia.	£2 2s. 8d. loss.	£2 2s. 1½d. loss.	6s. 9d. profit.	£1 4s. 3d. loss.
Rape Meal, .	5 cwt.	-	£3 8s. 10d. loss.	2s. 11d. loss.	-
Basic Slag, . .	5 cwt.	-	£1 18s. 7d. loss.	14s. 3d. loss.	-

#### EFFECT OF KAINIT.

Scutched flax per statute acre from unmanured plot, 19 st. 12 lb.

Scutched flax per statute acre from kainit plot, 22 st. 6 lb.

Estimated profit per statute acre from use of kainit, 7s. 4d.

The application of kainit at the rate of 6 cwt. per statute acre gave an increased yield of retted straw at nine centres, and of scutched flax at seven centres. The average results show that the dressing of kainit gave an increase of 2 st. 8 lb. of scutched flax as compared with the unmanured plot. The flax from the kainit plots was of slightly better quality than that from the unmanured plot, and a net profit of 7s. 4d. per statute acre was returned from the application of this manure.

#### EFFECT OF MURIATE OF POTASH.

Scutched flax per statute acre from unmanured plot, 19 st. 12 lb.

Scutched flax per statute acre from muriate of potash plot, 21 st. 10 lb.

Estimated profit per statute acre from use of muriate of potash, 1s. 0d.

The application of muriate of potash at the rate of 1½ cwt. per statute acre yielded an increase of retted straw at eight centres and an increase of scutched flax at seven centres. From the average results of the ten centres it will be seen that though the yields of retted straw and of scutched flax were increased by the dressing of muriate of

potash, the percentage yield of flax from straw, *i.e.*, the yield of fibre from a given weight of straw, was decreased. The flax from the muriate of potash plots was very slightly superior in quality to that of the unmanured plot, and the net returns from the former plots show a profit of 1s. per statute acre.

#### EFFECT OF SULPHATE OF POTASH.

Scutched flax per statute acre from unmanured plot, 19 st. 12 lb.

Scutched flax per statute acre from sulphate of potash plot, 23 st. 6 lb.

Estimated profit per statute acre from use of sulphate of potash, 13s. 2d.

The dressing of sulphate of potash at the rate of  $1\frac{1}{2}$  cwt. per statute acre resulted in an increase of retted straw and of scutched flax at nine centres. The average results as compared with those of the unmanured plots show an increase in the yield of retted straw and scutched flax and also a higher proportion of scutched flax to straw. The average quality of the scutched flax from the plots treated with sulphate of potash is approximately the same as that of the flax from the unmanured plots. The increased yield of scutched flax more than counterbalanced the cost of the manure, and a net profit amounting to 13s. 2d. per statute acre resulted from the use of sulphate of potash.

#### EFFECT OF A MIXTURE OF SUPERPHOSPHATE AND KAINIT.

Scutched flax per statute acre from unmanured plot, 19 st. 12 lb.

Scutched flax per statute acre from plot treated with mixture of superphosphate and kainit, 19st. 13 lb.

Estimated loss per statute acre from use of this mixture, 14s. 6d.

A mixture of equal weights of superphosphate and kainit was applied at the rate of 6 cwt. per statute acre to Plot 5 at each centre. As has been already stated the crop on these plots braided well, but the growth of weeds was much encouraged by the manurial treatment which, however, increased the yield of retted straw at seven centres and of scutched flax at six centres. The average returns from all centres show, however, that approximately the same amount of scutched flax was obtained from the plots treated with superphosphate and kainit as from the unmanured plots, although the weight of retted straw was much greater from the former plots. The average quality of the flax was also about the same on these two series of plots, and though slightly more

tow was yielded by those to which the above manurial mixture was applied the net returns from the dressing resulted in a loss of 14s. 6d. per statute acre.

#### EFFECT OF A MIXTURE OF KAINIT, SUPERPHOSPHATE, AND SULPHATE OF AMMONIA.

Scutched flax per statute acre from unmanured plot, 19st. 12lb.

Scutched flax per statute acre from plot treated with a mixture of superphosphate, kainit, and sulphate of ammonia, 20st. 11lb.

Estimated loss per statute acre from use of this mixture, £1.

Plot 6 at each centre was treated with a mixture of a phosphatic, potassic, and nitrogenous manure at the rate of 3 cwt. superphosphate, 3 cwt. kainit, and  $\frac{1}{2}$  cwt. sulphate of ammonia per statute acre. Plot 6 received, therefore, the same dressing as Plot 5 plus the small quantity of sulphate of ammonia. The mixture of three manures yielded more retted straw than the unmanured plot at all centres except one, and more retted straw than the mixture of superphosphate and kainit at five centres. The yield of scutched flax from Plot 6 (mixture of three manures) was increased only at six centres as compared with the unmanured plot, and in four cases was more than the yield from the plot treated with superphosphate and kainit only. The average returns show that the complete mixture produced the largest yield of retted straw of all the plots, whereas the yield of scutched flax was only 3 lb. per statute acre more than that from the unmanured plot. It follows then that the proportion of scutched flax from the retted straw was low, and a comparison of the figures will show that the ratio between flax and retted straw was widest in the case of the plot now under consideration. In other words, the mixture of superphosphate, kainit, and sulphate of ammonia increased the bulk of straw, but scarcely influenced the absolute yield of scutched flax. As might be anticipated from the foregoing, a relatively large proportion of tow resulted from the scutching of the straw grown with the help of the mixture of the three manures, and the returns show that this was the case, for more tow was obtained from Plot 6 than from any other plot. The flax grown on Plot 6 was somewhat inferior in quality to that grown on the unmanured plot, and the net returns show that a loss of £1 per statute acre resulted.

TABLE II.—SHOWING the RESULTS from the application

NO. OF PLOT		1.		2.	
MANURES APPLIED PER STATUTE ACRE		No Manure.		6 cwt. Kainit.	
Name and Address of Farmer.	Character of Soil.	Straw.	Flax.	Straw.	Flax.
		lb.	lb.	lb.	lb.
Dromara Co-operative Society, Dromara, Co. Down.	Medium loam ; gravelly sub-soil.	2,230	310	2,290	225
Dunboe Co-operative Society, Dunboe, Co. Londonderry.	Medium loam ; clay subsoil.	2,030	220	2,240	315
John Teadley, Castleroe, Coleraine, Co. Londonderry.	Heavy loam ; clay subsoil.	2,200	355	2,270	345
Neill Kennedy, Masterague, Co. Londonderry.	Medium loam ; clay subsoil.	2,040	275	2,650	355
Wm. H. Donaghy, Moneygobbin, Ballymoney, Co. Antrim.	Light loam ; clay subsoil.	2,240	340	2,930	470
Edward Bradley, Ballywilliam, Coleraine, Co. Londonderry.	Medium loam ; clay subsoil.	2,720	385	3,160	440
William Bailie, Macosquin, Co. Londonderry.	Light loam ; gravelly sub-soil.	1,850	260	2,310	330
William Hill, Drumaquill, Co. Londonderry.	Heavy loam ; clay subsoil.	1,920	260	2,000	275
George Kane, Articlave, Co. Londonderry.	Do.,	1,800	210	1,680	195
Robert Christie, Balleney, Co. Londonderry.	Medium loam ; clay subsoil.	1,450	165	1,560	190
Average yield of Retted Straw per acre.		2,048 lb.		2,309lb.	
Average yield of Scutched Flax per acre,		19st. 12lb.		22st. 6lb.	
Percentage of Scutched Flax from Retted Straw,		13.57.		13.59.	
Average Value of Scutched Flax per stone,*		7s. 10d.		7s. 11d.	
Average Returns from Scutched Flax per acre,		£7 15s. 7d.		£8 15s. 7d.	
Average Returns from Tow per acre,		16s. 2d.		18s. 6d.	
Total Average Returns from Flax and Tow per acre.		£8 11s. 9d.		£9 14s. 1d.	
Cost of Manures per acre,		—		15s.	
Profit or Loss from use of Manures,		—		Profit 7s. 4d.	

\* The flax grown on each plot at each centre was valued separately. These figures represent the averages of the valuations.

## of different MANURES to the FLAX CROP—(1904).

3.		4.		5.		6.	
1½ cwt. Muriate of Potash.		1½ cwt. Sulphate of Potash.		3 cwt. Kainit and 3 cwt. Superphosphate		3 cwt. Kainit, 3 cwt. Superphosphate, ½ cwt. Sulphate of Ammonia.	
Straw.	Flax.	Straw.	Flax.	Straw.	Flax.	Straw.	Flax.
1b.	1b.	1b.	1b.	1b.	1b.	1b.	1b.
2,080	255	2,360	315	2,060	255	1,980	240
2,640	345	2,430	325	2,040	240	2,270	240
2,420	360	2,500	370	2,730	400	2,540	350
2,420	335	2,660	375	1,890	245	2,590	265
2,800	410	3,020	425	2,790	375	3,480	430
2,740	330	2,350	335	3,180	240	2,940	210
1,860	275	2,120	315	1,760	235	1,990	270
2,310	335	2,260	335	2,490	330	2,340	300
1,790	205	2,080	235	1,980	225	1,870	220
1,680	195	2,120	255	2,150	250	2,320	285
2,274 lb.		2,390 lb.		2,307 lb.		2,432 lb.	
21st. 10lb.		23 st. 6 lb.		19 st. 13 lb.		20 st. 11lb.	
13.39.		13.74		12.11.		11.6	
7s. 10½d.		7s. 10d.		7s. 9½d.		7s. 9d.	
£3 11s. 4d.		£3 4s. 3d.		£7 16s. 1d.		£7 15s. 6d.	
17s. 7d.		17s. 11d.		18s. 5d.		£1 0s. 6d.	
£9 8s. 11d.		£10 2s. 2d.		£8 14s. 6d.		£8 16s.	
16s. 2d.		17s. 3d.		17s. 3d.		£1 4s. 3d.	
Profit 1s.		Profit 13s. 2d.		Loss 14s. 6d.		Loss £1.	



The chief general conclusions to be derived from the manurial experiments carried out by the Department during the past four seasons are summarised as follows :—(See Table I., p. 451.)

- (i.) That a potassic manure may usually be depended upon to give profitable returns when applied to the flax crop.
- (ii.) That potassic manures effectually prevent “yellowing” in the early stages of growth.
- (iii.) That basic slag or rape meal applied at sowing time does not yield profitable returns.
- (iv.) Nor is the application of a mixture of potassic and phosphatic manures (kainit and superphosphate) remunerative.
- (v.) That though the bulk of crop and yield of retted straw may be increased by a dressing of a mixture of potassic, phosphatic, and nitrogenous manures (kainit, superphosphate, and sulphate of ammonia) the yield of scutched flax is not proportionately increased, and the use of the mixture is not to be recommended.
- (vi.) That a phosphatic manure (superphosphate or basic slag) encourages a strong growth of weeds to the detriment of the flax.

It should also be observed that the application of a potassic manure to flax not only benefits that crop, *but in many cases has a marked influence in encouraging the growth of clovers in the following year.*

## II.—VARIETY TEST.

As it was not possible to obtain good Riga Pernau Crown seed in 1903, this variety was not included in the trials conducted that year. In 1904, however, a good sample was obtained.

The trials of varieties of flax seed made last year were therefore identical with those made in 1901 and 1902, and included tests of the following brands :—

Riga Seed :—(a) Belfast Brand, and (b) Pernau Crown.

Dutch Seed :—(a) Belfast Brand, and (b) Riga Grandchild.

The seeding in each case was at the rate of sixty-two quarts per statute acre. The detailed results of these trials are shown in Table III., page 458, from which it will be seen that the Dutch seed (Belfast Brand and Riga Grandchild) gave better results than both brands of

Russian seed, and of the two varieties of Dutch seed the Riga Grandchild gave the better returns.

In 1901 and 1902 Russian seed gave better financial returns than the Dutch, but in the two succeeding years Dutch seed yielded better returns than the Russian. The yield of the flax crop varies very largely according to the quality of the seed sown, and this in turn is influenced by many factors. In order therefore to form an opinion as to which seed—Russian or Dutch—is likely to be the more suitable for sowing in Ireland in any one season, attention must be paid to crop reports for the previous season from Russia and Holland, and also to the climatic conditions prevailing during the harvesting of the seed. The nature of the crop and the weather during harvesting are often quite different in these two countries, and to this must generally be ascribed the difference in the quality of the seed produced and the consequent difference in the crops yielded by the seed when sown in Ireland the following year.

#### HOME SAVED SEED.

A small quantity of flax dried on a field near Coleraine in 1903, was ripped during the winter, and the resulting seed sufficed for a test of Irish home-saved seed at three centres. The average results of the three centres were as follow :—

Average yield of retted straw per acre,	2,383 lb.
Average yield of scutched flax per acre,	23 st. 8lb.
Percentage of scutched flax to retted straw,	13·84
Average value of scutched flax per stone,	8s. 0½d.
Average returns from scutched flax per statute acre,	£9 9s. 2d.
Average returns from tow per statute acre,	19s. 9d.
Total average returns from flax and tow,	£10 8s. 11d.

It will be seen from Table III and the above that in these trials the home-saved seed gave considerably better returns than the Russian seed (Belfast Brand and Pernau Crown), or the Dutch seed (Belfast Brand), and almost as high a return per statute acre as the Dutch Riga Grandchild. Pending further trials of a like nature no general conclusions can be safely drawn, however, from the results of these few tests.

#### III.—SCUTCHING TESTS.

The results from the scutching tests carried out in 1904–5 are not yet available, and the report on this division of the flax experiments will therefore be published at a later date.

TABLE III.—Showing the Results from the use of Different Varieties of FLAX SEED.

Name and Address of Farmer.	No. of Plot	Character of Soil	1.		2.		3.		4.	
			Riga Seed—Belfast Brand.		Riga Seed—Pernau Crown.		Dutch Seed—Belfast Brand.		Dutch Seed—Riga Grandchild.	
			Straw.	Flax.	Straw.	Flax.	Straw.	Flax.	Straw.	Flax.
1. Dromara Co-operative Flax Society, Co. Down.		Medium loam: gravelly subsoil.	lb. 2,350	lb. 280	lb. 1,890	lb. 245	lb. 2,020	lb. 265	lb. 2,190	lb. 315
2. Dunboe Co-operative Flax Society, Co. Londonderry.		Petty soil: clay sub-soil.	2,170	236	2,210	250	2,450	345	2,040	370
3. John Teadley, Castleroe, Coleraine, Co. Londonderry.		Heavy loam: clay subsoil.	2,450	350	2,480	390	2,850	400	2,710	415
4. Neill, Kennedy, Masternag, Coleraine, Co. Londonderry.		Medium loam: clay subsoil.	2,070	300	2,320	335	2,590	300	2,270	415
5. Wm. H. Donaghy, Moneygobbin, Ballymoney, Co. Antrim.		Light loam: clay subsoil.	2,670	335	2,840	390	2,570	415	2,690	410
6. Edward Bradley, Ballywilliam, Coleraine, Co. Londonderry.		Medium loam: clay subsoil.	2,000	335	2,710	365	2,800	380	3,110	365
7. Wm. Baillie, Mascoquin, Co. Londonderry.		Light loam: gravelly sub-soil.	1,440	200	1,760	245	1,850	255	2,000	315
8. Wm. Hill, Drumauquil, Co. Londonderry.		Heavy loam: clay subsoil.	2,160	320	2,240	320	1,820	250	1,770	230
9. George Kane, Articlave, Co. Londonderry.		Do.	1,810	240	1,710	195	1,560	240	2,130	280
10. Robert Christie, Balleney, Co. Londonderry.		Medium loam: clay subsoil.	2,360	265	2,530	325	2,400	340	2,590	305
Average Yield of Relted Straw per statute acre			2,503 lb.		2,272 lb.		2,304 lb.		2,419 lb.	
Average Yield of Scutched Flax per statute acre			21 st. 6 lb.		21 st. 12 lb.		23 st. 5 lb.		24 st. 6 lb.	
Percentage of Scutched Flax to Relted Straw.			13.58		13.46		14.19		14.13	
Average Value of Scutched Flax per stone.*			8s.		7s. 11d.		8s. 0½d.		7s. 11½d.	
Average Returns from Scutched Flax per statute acre.			£8 11s. 6d.		£8 12s. 10½d.		£9 8s. 3d.		£9 13s. 8d.	
Average Returns from Tow per statute acre.			16s. 6d.		17s. 3d.		17s. 7d.		18s. 6d.	
Total Average Returns from Flax and Tow.			£9 8s. 0½d.		£9 10s. 14½d.		£10 5s. 10d.		£10 12s. 2d.	

\* The flax grown on each plot at each centre was valued separately. These figures represent the averages of the valuations.

## IV.—THE INFLUENCE OF RIPPLING.

The influence of rippling was again tested by an experiment conducted in the same manner as in the previous year. The procedure was as follows.—Two tons of green straw from an apparently even crop of flax were weighed out on the field. One ton was at once rippled. The rippled and unrippled straw were then retted in the same pond. A careful record of the cost of rippling and of the produce of and returns from each lot was kept. Table IV. shows a financial statement of the results:—

TABLE IV.

Produce of One Ton of Green Straw Rippled.			Produce of One Ton of Green Straw not Rippled.		
	£	s. d.		£	s. d.
66 lb. of Scutched Flax, at 8s. per stone,	1	17 8½	61 lb. of Scutched Flax, at 8s. per stone,	1	14 10
9 lb. Fine Tow, at 3½d. per lb.,	0	2 7½	7½ lb. Fine Tow, at 3½d. per lb.,	0	2 2
55 lb. Coarse Tow, at 2s. 9d. per cwt.,	0	1 4	59 lb. Coarse Tow, at 2s. 9d. per cwt.,	0	1 5
76 lb. Flax Seed, at 10s. per cwt.,	0	6 9			
Gross Return,	2	8 1	Gross Return,	1	18 5
Less Cost of Scutching £ s. d. 66 lb., at 2s. per stone,	0	9 5	Less cost of Scutching 61 lb. at 2s. per stone,	0	8 9
Less Cost of Rippling and Cleaning Seed,	0	4 0	Net Return,	1	9 8
	0	13 5	Balance in favour of Rippling, per ton of green straw,	0	5 0
Net Return,	1	14 8		1	14 8

From the above table it will be seen that the scutched flax from the rippled and unrippled straw was of the same quality, *i.e.*, the rippling had not in any way damaged the fibre. More scutched flax was obtained from the rippled than from the unrippled straw. This may partly be due to a slight difference in the quality of the straw comprising the two lots, although the crop from which they were weighed was apparently even in length, quality, and freedom from weeds. On the other hand the rippled flax was much straighter in the beats, and this may have advantageously influenced the yield. Slightly more tow was produced from the unrippled portion. A much higher yield of seed than in the previous year resulted from the rippling. The seed was sold at 10s. per cwt., and after deducting cost of rippling and cleaning seed there remains a net profit of 5s. per ton of green straw in favour of rippling.

#### THE CULTIVATION AND HANDLING OF THE FLAX CROPS IN FLAX-GROWING CENTRES ON THE CONTINENT.

In July, 1904, a deputation of Irish farmers visited some of the

flax-growing districts on the Continent. They report as follows on the cultivation and handling of the crop:—

We, the deputation appointed by the Department of Agriculture and Technical Instruction for Ireland and the County Committees of Agriculture and Technical Instruction of Ulster, to visit the flax-growing districts of Belgium and Holland, having now finished our visit, beg to lay before the Department and others interested in the flax industry—(1) a synopsis of what we saw and heard there; (2) a statement of how far, in our opinion, it would be possible to apply to Ireland the methods of sowing, rippling, retting, and drying, as practised on the Continent.

We first went to the Courtrai district in Belgium, which is the centre of a very large industry. This district is traversed by the river Lys, which is practically a canal, and is noted for its inherent qualities for retting. The whole district on both sides of the river for thirty miles is almost entirely given over to the flax industry, 50,000 hands being employed the whole year round.

The ground is prepared in much the same way as in Ireland, with the exception that it gets a dressing of liquid manure ten or twelve days before the seed is sown. The sowing is commenced about the end of February. The greatest possible care is taken to prevent the growth of weeds, each field being thoroughly weeded twice within the first eight weeks. The crop is allowed to ripen much the same as in Ireland. Most of the flax is sold to factors before being pulled. It is then pulled and dried by the farmer or by the factor, according to arrangement. A small portion of the crop may be pulled and dried by the farmer, and the dried straw sold by weight. The pulling is done by carefully-trained hands and the flax placed in handfuls on the ground. It is then put up in "rickles" and allowed to dry. The retting and further treatment is done entirely by the factors and merchants. The seed is often taken off during the winter and early spring, and the flax is then retted and scutched during the same year, *i.e.*, the year after growing

The dried flax is then carted to the banks of the Lys, and the later stages of its manufacture carried out by the merchants. Each merchant owns or rents certain portions of the banks of the river, and has a number of wooden crates, about 12 feet by 12 feet by 4 feet, sheeted with coarse linen, in which the flax is steeped. When almost retted it is taken out, "gated," allowed to dry, re-

tied in bundles, and again steeped. We were informed that the second retting is of decided advantage to the quality of the flax—increasing its value to a large extent.

The first retting takes from seven to ten days, and the second from six to eight, according to the temperature of the water.

The system adopted at Courtrai, is, to us, entirely new, and has many things to recommend it. In the first place merchants are enabled to keep their hands employed all the year round; secondly, the farmer is saved the trouble of handling the crop at the time of year when he most needs all the help he can command for his other crops.

We would suggest to the Department the advisability of giving the Courtrai system of retting a trial in Ireland, as we believe it would be successful. In many districts in Ulster the disused canals could be conveniently used for these experiments.

We visited one district on the Lys—Wevelghem—and found the farmers had started a scutch mill on the co-operative system, fitted with the latest and most up-to-date machinery and appliances. Each shareholder owns one or more stocks and usually scutches his own flax. On the day of our visit 150 hands were working in the mill. The tow is forfeited to the society for the repair of machinery, rents, &c., and the profits, if any, at the end of the year are divided among the shareholders.

We next visited the Bruges and Swevezaele districts, where the flax is green rippled by the farmer and sold to the factors immediately after rippling. The rippled flax is retted before being dried. In this district a mill has been established for the purpose of crushing seed. The process seems a simple one and might be established in any flax-growing district in Ireland with good results.

The next district visited was Lokeren and St. Nicholas. The system here adopted is again much the same as in Ireland. The flax is carefully pulled and tied in sheaves about the usual Irish size. The retting ponds are of the ordinary kind, and the flax is placed carefully in rows by the hand and covered with four inches of mud from the bottom of the pond, care being taken to cover all the flax. It is allowed to remain in steep about eight days, according to the temperature. When taken out each beat is washed and placed on end, and allowed to remain for twenty-four hours. The

flax is then spread in the ordinary way and lies on the spread field for about three weeks. When on the spread it is turned once a week, and should the weather be showery, much oftener. The turning is done with the help of long rods which are slipped under the rows.

Near Lokeren the seed is green rippled, dried, and sold to the oil-cake manufacturers. We were informed that the returns from the seed paid for all the labour up to the retting stage. The farmers of this district are of opinion that the best results are obtained when the flax is pulled green and steeped immediately after rippling. They suggested the advisability of saving Irish seed and exporting it to Holland for sowing, expressed an opinion that it would pay both parties, and said they would prefer it to Riga, if properly saved. What is known as "dew" retting is practised in this district, but only when the crop is inferior. The procedure is to spread the flax immediately after pulling, and allow it to remain from six to ten weeks on the grass. It is turned occasionally—say once in two weeks, or, in showery weather, oftener. We do not think this system could be applied to Ireland.

We next visited the flax-growing districts in the neighbourhood of Rotterdam. The flax there is allowed to ripen more than in the other districts, and the seed is saved for sowing purposes.

The seed for the first sowing is imported from Riga, and the first season's crop is known as "Dutch Riga Child," which is generally exported to Ireland for seed. "Grandchild," or third year's crop, is not usually sown or exported except in case of failure of the "Child" crop. We were assured that seed for sowing purposes exported from this district is never kiln-dried, as is the case generally with Riga.

We were also informed that the fibre of flax is not injured by rippling.

The rotation generally is as follows:—

First year's crop.	Rye (manured).
Second     ,,	Oats (manured).
Third       ,,	Clover (manured).
Fourth     ,,	Barley or rye (manured).
Fifth       ,,	Potatoes or rye (artificial manure).
Sixth       ,,	Barley (extra manured).
Seventh    ,,	Flax (liquid manure).

*General remarks as to seed.*—Riga seed is considered the best when pure. It gives the longest and healthiest fibre and best seed, but does not yield as large a quantity as “Dutch Riga Child.” White-blossomed Riga is less liable to disease and gives best yield, but not so good fibre as the blue blossom. A mixture of both gives good results. 70 per cent. of Riga and 80 to 85 per cent. of Dutch is considered a good percentage of germination. On virgin lands Riga seed is always sown. The average amount of seed sown per acre (statute) is two and a quarter bushels. We were informed the best seed district is Zealand.

The practice of using artificial manure for flax is condemned by the merchants in the strongest terms.

In the mills the rolled flax is weighed out to each scutcher and again weighed out when finished, and thus a valuable check is put upon the workman. All the mills are exceptionally well lighted and ventilated, the machinery is of a much lighter cast than that used in Ireland, is driven slower, and has double the number of blades customary in Irish mills.

In almost every flax-growing district a second crop is taken off the ground. Turnips, carrots, and clover are the principal crops thus grown. Turnips are sown in the ordinary way when the flax is pulled early in July; carrots and clover are sown at same time as the flax.

The price realised by farmers for their green flax, pulled and carted to the steep, varies considerably. The average price for green flax may be put down as £10 per statute acre, and that for scutched flax about £59 per ton.

We desire also to state that we were struck by the general appearance of prosperity and thrift everywhere apparent throughout the two countries. The land is in the highest state of cultivation. There are no waste grounds or uncropped headlands. Fences and hedgerows are seldom seen. The farmhouses and labourers' cottages appear to be clean and comfortable. In a word, signs of industry and thrift are to be seen on every hand. The land is cropped in rotation, and the cattle are mostly house-fed. The milch cows are larger and better milk producers than we have in Ireland, and many of the calves are sold as veal, being fat in four to five months, and realising from £6 to £8 each.

Before completing this report, we wish to place on record our thanks to the several gentlemen who so kindly met us in the



different districts, and did everything in their power to give us all information, and to show us the flax in the different stages of cultivation and handling.

(Signed),

WM. H. WEST, Fermanagh.

J. JACKSON BAIRD, Antrim.

ANDREW J. MORROW, Down.

THOMAS CRAWFORD, J.P., Monaghan.

ROBERT DICK, R.D.C., Tyrone.

P. GEO. SHAW, J.P., Armagh.

PATRICK KELLY, J.P., Donegal.

SAMUEL S. YOUNG, R.D.C., Derry.

JOHN FAY, Cavan.

# THE CULTURE AND CURING OF TOBACCO.

## NOTES ON EXPERIMENTS

Undertaken by Colonel N. T. EVERARD, D.L., at Randlestown, County Meath, during 1904

The experiments in the growing and curing of tobacco in Ireland, during the last six years, on a small scale, having proved successful, it was decided by an Advisory Committee, appointed by the Department of Agriculture, composed of tobacco manufacturers, retailers and growers to recommend an experiment on a commercial scale, extending the cultivation to twenty acres.

The Chancellor of the Exchequer, having been approached on the subject, consented to extend the facilities previously granted for experiments in the cultivation of tobacco, and authorised the payment by the Board of Inland Revenue of a refund of one-third the existing duty for a period of five years to persons growing tobacco in this country, for experimental purposes, under special sanction.

Two centres were suggested for experiments in 1904, one in Co. Meath and one in Co. Wexford, the Department of Agriculture undertaking to provide barns and heating apparatus for the curing, and, if possible, to supply expert assistance.

It was agreed that at least ten, and not more than twenty, acres should be available at each centre for the purpose of the experiment, and that the persons selected to grow the tobacco should, at their own expense and on their own responsibility, provide suitable land, obtain the tobacco seed required, and procure the labour necessary for the proper cultivation of the crop.

Unfortunately the Department were unable to procure an expert from America in time to superintend the planting and after-cultivation of the crop. It was, therefore, found impossible to start the experiment in Co. Wexford.

Colonel Everard, however, on whose estate the experiment in Co. Meath was to be conducted, and who had had six years' experience in growing the crop in Ireland, consented to undertake the whole experiment of twenty acres, in order that it should be of a thoroughly practical nature.

The writer, by Colonel Everard's directions, proceeded to America in December, 1903, to study the best methods of growing and curing the crop.

The methods adopted in the cultivation of the crop were based on American practice.

Mr. J. N. Harper, Professor of Agronomy at the State Agricultural College of Kentucky, who generously undertook to superintend the curing of the crop, considered the results obtained highly satisfactory.

His suggestions as to improvements in the method of cultivation and curing are embodied in this report :—

In order to make the experiment as comprehensive as possible the crop was grown on four different soils :—

**Soil.**

1. A rather heavy clay loam with a clay subsoil in good manurial condition.
2. Similar to No. 1, but in a low state of fertility.
3. A light loam with a clay subsoil.
4. A light gravelly loam with a sandy subsoil.

No. 1 produced the best results, the tobacco growing well and curing out a good colour with plenty of body and elasticity, and the yield was satisfactory.

No. 2.—Owing to the poorness of the soil, the yield was disappointing.

No. 3.—The result was not as good as No. 1 as regards yield, but the colour, body and texture were good.

No. 4 cured out a good colour, but lacked elasticity and body. The yield was disappointing.

It would, therefore, seem that a strong rich loam with a clay subsoil is the most suitable for growing tobacco.

Tobacco, however, will not thrive except on a well-drained soil ; a retentive clay subsoil is therefore to be avoided.

The quality of the tobacco is largely dependent on the " texture " of the soil.

By " texture " is meant the size of the soil particles—the smaller the particles the greater the surface exposed to the disintegrating effect of the atmosphere, more moisture is retained for oxidising the mineral constituents of the soil, and more surface is exposed to the rootlets of the plants. The period of growth of the tobacco plant is only twelve weeks, and, therefore, the rootlets must be able to ramify through the soil with ease in search of plant food.

The following varieties were sown :—

- |                 |                  |
|-----------------|------------------|
| <b>Variety.</b> | 1. Yellow Prior. |
|                 | 2. Blue Prior.   |
|                 | 3. Hestor.       |

The seed was obtained from one of the largest seed farms in the United States.

The greater portion of the crop consisted of "Yellow Prior," which, although not producing as heavy a yield as "Blue Prior," is well worth a trial.

"Blue Prior" produced the largest yield of the varieties tried, some of the leaves in the green state measuring 40 inches in length by 21 inches in breadth, and seems to be the variety most suited to this country.

"Hestor."—This variety produced a rather thin leaf, which, however, cured out a good colour.

The yield was not as large as the two other varieties tried.

In America there are three modes of raising plants generally used :—

- |                  |   |
|------------------|---|
| <b>Seed Bed.</b> | 1. In an American hot bed covered with glass.   |
|                  | 2. In an American hot bed covered with canvas.  |
|                  | 3. In an ordinary cold bed covered with canvas. |

In this experiment another method was tried :—

Starting the plants in boxes in a greenhouse, with heat, and then pricking them out into a cold bed covered with canvas.

Whichever method is used great care has to be exercised in the choice of the site of the seed bed and also in the cultivation.

The best site is one having a southern exposure, well sheltered from the north, so as to get as much sun as possible.

The American hot bed covered with canvas produced the best results and was at the same time the most economical.

Almost as good results were obtained from the bed covered with glass, but at a higher cost.

The plants in the cold bed came up irregularly and nearly all damped off, and the plants grown in the greenhouse and pricked out were inclined to "stag." An American hot bed is made in the following manner :—"The clay is shovelled out about 5 feet in width and for the length required, to the depth of 18 inches.

Then about 3 or 4 inches of fresh straw is placed in this trench and covered with 6 to 8 inches of fresh stable manure. On the top of this about 5 inches of really good clean soil, in which has been incorporated some good tobacco fertilizer, is placed.

One teaspoonful of seed, mixed with a gallon of Indian meal, and sown as evenly as possible on a bed thus prepared, is sufficient to sow from 9 to 15 square yards.

If the plants come up evenly this ought to give enough plants to plant 1 to  $1\frac{1}{2}$  acres.

The bed is protected in the following manner :—

Boards are placed all round the bed— 18 to 20 inches high on the exposed side, sloping down to 10 to 12 inches on the other side.

Pegs about 15 inches high are then placed down the centre of the bed, and a wire passing through a staple on top of each of these pegs is run from one end of the bed to the other. Two pieces of fine tiffany sown together and a cord run on their outer edge to attach to nails driven into the frame are sufficient to cover a bed of the breadth mentioned.

The best time for sowing the seed is the latter end of February or the beginning of March. After sowing, the bed should be lightly raked over so as to give a slight covering for the seed. Too much covering, however, is destructive to the seed.

When the plants come up, if they are too thick the bed should be well raked in order to remove the superfluous plants. If the plants are attacked by wire-worm a dressing composed of one teaspoonful of "Paris green" to two gallons of water will eradicate them.

During the spring the bed must be kept as clean as possible and watered daily should a spell of dry weather occur.

From the middle of April the canvas covering should be removed during the day in favourable weather and replaced at night.

When selecting a field for tobacco the all-important subject of shelter from the prevailing winds should be carefully considered.

Wind storms cause enormous damage to the crop : not only is the yield reduced, but the produce is greatly decreased in value.

Perfect leaves command the highest price per lb., and these are impossible to obtain unless a well sheltered field is selected.

In Kentucky the best quality of tobacco is obtained on prime old grass land.

The method employed for the cultivation of tobacco there, is as follows :—

In autumn the land is ploughed about 3 inches deep, and a second plough is run in the same furrow, ploughing from 5 inches to 8 inches deep, according to the depth of the soil. The old sod is, therefore,

buried from 8 inches to 11 inches. It is customary to apply about 20 tons of farmyard manure per acre, either just before ploughing or preferably the year before, in order that it should be well incorporated with the soil. The land is then left till the spring, when it is cultivated with a disc harrow, and an ordinary harrow then used two or three times in order to give a fine tilth.

When it is proposed to set out the plants the field is scored by means of a marker, which can be easily made by a local carpenter, with lines 3 feet apart.

Another marker making lines 1 foot 6 inches or 1 foot 9 inches apart is run at right angles: where the lines intersect, a boy places a measured amount of artificial manure, and a man draws the earth into a "hill" with a hoe and flattens it for the reception of the plant.

If the plants are in a forward condition, i.e., about 4 inches high, planting is commenced as soon as the danger of spring frost is over.

The plants are carefully raised with a two-pronged fork from the seed-bed, which is moistened if necessary, and placed in baskets (the boxes used for sprouting potatoes make an excellent substitute).

Great care must be taken not to damage the plants in any way.

The baskets are then placed on a cart and taken to the field to be planted.

If the staff for planting consists of four planters and two boys, each boy is given a basket of plants and drops them on two rows in front of the planters.

Each boy drops two plants on the first "hill" of each row and one plant on each succeeding "hill."

The planters follow with a dibble about 6 inches long, and plant one plant on the first hill of each row, pressing the earth firmly round the plant, but taking care not to bruise it.

They then pick up the spare plant and have it ready for planting by the time they reach the second "hill." All misses are replaced as soon as possible.

In this experiment tobacco was grown after cabbages, turnips, mangolds, and oats, and also on two-year lea—that on two-year lea appeared to give the best results, but that may be partially accounted for from it being the most sheltered portion of the field.

Farmyard manure at the rate of from 20 to 30 tons per statute acre was applied before ploughing in January; in spring the land was thoroughly cultivated and cleaned.

Owing to the wet season this was a matter of some difficulty, especially on the heavier soils.

In order that the crop should not be damaged by the inexperienced workmen employed it was decided to place the plants further apart than would otherwise have been necessary.

The ordinary double mould board plough was used, and the drills were made 3 feet 6 inches apart. A special fertilizer was prepared by the writer's directions, containing 15 per cent. phosphates, 5 per cent. ammonia, and 10 per cent. sulphate of potash guaranteed free from chlorides, the cost of which was £6 6s. per ton. This was spread by hand on the centre of drill before closing, at the rate of 6 cwt. per statute acre.

The plants were raised from the seed bed and planted on the drills 3 feet 6 inches apart, one boy dropping for the two planters.

The planting out was commenced on the 31st May, and the planting of the whole 20 acres completed on June 16th.

Unfortunately a drought occurred during the month of June, and it was found necessary to water the plants. In the case of the earliest planted three waterings were given.

When properly organised the actual cost of this operation worked out at 2s. 9d. per statute acre for each watering.

The after-cultivation of tobacco planted on the ridge is slightly different to that employed when planted in

**After-Cultivation.** "hills." Where tobacco is grown on the ridge, as in this experiment, three or four horse hoeings are necessary, running the hoe as near the plants as possible without injuring them.

The soil between the plants in the drill is kept clean by hand hoeing, care being taken not to expose the roots of the plants and to put back to the plant as much earth as is taken away.

When tobacco is grown on "hills," about ten days after planting run a single horse plough between the rows, throwing the earth away from the plants—then three or four days afterwards use a drill harrow, which will throw a certain amount of covering back to the plant.

After this by repeated hand hoeings keep the spaces between the plants clean, always putting back to the plant as much earth as was hoed away.

In hoeing great care must be taken not to injure the leaves. Each leaf injured means a leaf lost.

The earth must always be kept up well round the stalk of the plant, in order that it should be able to withstand wind storms and extract the maximum amount of nourishment from the soil.

About six to eight weeks after planting, the seed or terminal bud appears in the majority of the plants.

**Topping and  
Suckering.**

Topping is performed by pinching out these terminal buds as soon as the required number of leaves can be secured.

The number of leaves left on the plant vary from eight to twelve, as the judgment of the grower may determine.

In pinching out the bud great care must be taken not to injure the tender top leaves. A very slight injury will develop into serious blemishes when the leaf has reached its full growth.

When the seed bud has been removed the plant makes vigorous efforts to reproduce itself, and the buds at the axils of the leaves begin to produce suckers.

These suckers must be diligently removed up to the time of harvesting.

The heavy storms which occurred during the month of August caused great damage to the plants, especially those planted in exposed situations.

**Harvesting.**

A certain amount of the crop was fit for cutting about the 25th August.

The maturity of the plant is indicated by its general appearance. The leaves droop, and become thick and mottled with yellowish spots.

They also become brittle, breaking easily when folded over. If the cutting is deferred too long brown spots appear on the leaves, which are signs of decay. It is better, however, to let tobacco stand a little too long than to cut it too green.

The harvesting in this experiment was delayed until the arrival of Professor Harper, and was not commenced until September 6th.

The plants were cut with a spade-shaped knife close to the ground, and allowed to lie on the field until "wilted," which took from four to six hours.

Hay lorries were used to carry the plants to the curing barn, a tray of canvas being fitted to a frame about 18 inches above the platform of each lorry.

The plants were carefully placed on each platform, about two rows deep on a bed of hay to avoid bruising, with the butts of the plants on the outside, and taken to the barns. The plants were then tied to the tobacco sticks with binder twine—from six to eight plants to each stick, according to the size of the plants.

These sticks were 4 feet 6 inches long, by 1 inch by 1 inch.



The sticks, with the plants on them, were then hung on tiers in the barn, leaving about 9 inches between the sticks.

There are, roughly, four methods of curing tobacco practised in America.

### **Tobacco Barns.**

1st. *Air curing* in large barns without artificial heat, which is impracticable in this country owing to the moistness of our climate, which induces the formation of mould.

2nd. *Virginian Cure*.—In small, air-tight barns, about 20 feet square and 20 feet high, each barn holding about 4,500 plants. During the curing by this method, which takes from four to six days, the temperature is raised as high as 180° by means of flues heated by wood fires.

3rd. *A Modification of Above*.—Used in Kentucky, the barns in some cases being as large as 40' × 30' × 20', and the heat supplied by means of flues, as in the Virginian cure. In this case the temperature is never raised above 100°, and the cure is slowly conducted, occupying from four to six weeks.

4th. *Smoke Cure*.—Largely used in Kentucky, in barns of various sizes. The temperature is never raised above 90°, the source of heat being open wood fires lighted on the floor of the barns. This cure occupies from four to six weeks.

Owing to the impossibility of obtaining an expert from America in time to superintend the building of a barn to suit the particular method of curing to which he might have been accustomed, it was decided to construct one, on which either the "Virginian cure," or the modification of it as practised in Kentucky, could be employed, these two methods being considered most suitable for our climate.

In order to economise space, and reduce the cost of construction by having all the barns under one roof, a building was constructed 100' long by 40' wide by 20' high, divided into ten "rooms" each 20' every way. The frame of the building was composed of iron and wood pillars, with a concrete foundation.

The outer walls were of galvanised iron and the inner of  $\frac{5}{8}$ " V-jointed sheeting lined with brown paper, the space between being filled with sawdust.

For the divisions between the rooms, V-jointed sheeting, lined with brown paper, was nailed to the uprights, and the intervening space was filled with sawdust.

The roof was composed of fire-proof felt, sheeted on the inside. Insulated doors were used for each room. On the roof of each room

a ventilator was placed, which could be opened or closed at will from the ground. Bottom ventilation, which could be controlled at will, was provided for each room. In each room four tiers of poles were placed 4' apart and 3' 6" between the tiers. At the end of the building a lean-to was erected 40' x 20' for sorting and prizing of tobacco.

In order to be able to regulate the temperature exactly, to diminish the cost of fuel and attendance, and to do

**Heating.** away with the danger of fire, it was decided to heat the building by steam. A 22 h.p. boiler and steam pipes were provided for heating the building. By means of a steam trap and regulating valve each room could be kept at any desired temperature, the main supply pipe running outside the building. It was calculated that this building would hold 10 acres of tobacco, and it was hoped that two curings could be accomplished in the season in each room. This, however, proved impracticable, and some of the plants had to be hung in cattle sheds until the tobacco in the barns was sufficiently wilted to be placed closer on the tiers, thus making room for the rest of the crop. Professor Harper, to whose technical knowledge and untiring efforts the success of this initial venture in curing tobacco, on a large scale, in Ireland is mainly due, was entirely satisfied with the buildings constructed. He at first attempted the Virginian cure, which he found to be impracticable. Owing to the large amount of moisture in the plants when taken into the barn, he found it impossible to expel the moisture quickly enough to "fix" the bright yellow colour required. As the result of his exhaustive experiments on the various barns, he recommends the following method of curing as most suited to the Irish climate.

The sticks, on which the plants are tied, having been hung about 9' apart on the tier-poles, the temperature of

**Curing.** the room is raised to 80°, with both top and bottom ventilators open in order to "wilt"

the plants—i.e., get rid of this superfluous moisture.

The temperature at this stage should not be allowed to rise above 85°, otherwise there would be a danger of bursting the plant cells and the tobacco curing a green colour.

After the tobacco has thoroughly wilted, which will take about a week, all vents should be closed, and the temperature raised to 90°. This should not be too soon, otherwise the tobacco is liable to "house

burn," a kind of premature fermentation. This temperature should be kept up for three or four days, to "yellow" the tobacco at this stage. A smouldering fire of oak sawdust is placed in the room for one day, and again at intervals during the curing. When the tobacco, in the opinion of the operator, is sufficiently yellowed, raise the temperature of the barn to 100° for four hours, then cut off all heat. When the temperature of the barn has fallen to about 70°, open the ventilators. Keep the barn at this temperature, with the ventilators open, until the tobacco becomes just crisp enough to bend between the fingers without breaking. Then close the ventilators and raise the temperature to 85°.

This will bring the tobacco into "case," *i.e.*, make it soft again. Allow it to remain a few days in this state in order to "run the colour." This is the time that mould is liable to make its appearance. If this should happen, open the ventilators and allow the tobacco to dry out at a temperature of 70°.

Then close ventilators again and raise the temperature to 90°, which will bring the tobacco into "case" again. Should this, however, not bring it sufficiently into "case," artificial means must be tried. Either pouring water on the hot steam pipes, or placing damp straw on the barn floor, will bring about the desired result. When the tobacco is sufficiently in "case" the heat is kept at 80° with all the ventilators closed for three or four days, and then the barn is left without heat for about the same time. Then the temperature is again raised to 80°. This alternate heating of the barn and allowing it to remain without heat is kept up until the tobacco is thoroughly cured. All this time mould must be carefully looked out for and checked as soon as it appears.

When ready to strip the tobacco, raise the temperature to 90° and open all ventilators. Keep the barn at this temperature for three or four days, until the stem of the leaf is dry. Then cut off the heat, bring the tobacco into "case" artificially as before described and pack down on a raised platform of planks for stripping.

In this experiment thirteen hands were employed for this operation.

The plants placed in bulk in the sorting shed were covered with a tarpaulin to retain the moisture. The plants, as required, are taken from the bulk and placed at the end of the first table, at which three women were seated.

The first woman stripped off two or three of the bottom leaves called "flyings." These were tied into bundles called "hands" (containing

about fourteen leaves) by a boy beside her. She then passed the plant to the second woman, who removed all the leaves except the two top ones, and passed these on to the third woman, who removed them from the stem and tied them into hands containing about fourteen leaves. These are called "tips." If the plants had been "topped" lower this grade would not have been necessary.

The leaves stripped by the second woman were taken to three other tables, at each of which was one man to sort the leaves into grades and two boys to tie them into hands.

Each sorter divided the leaves into three grades, according to their size, quality and texture.

*First Grade, "Leaf."*—Suitable for wrappers, the undamaged leaves with the best quality and texture—tied in hands containing eight leaves.

*Second Grade, "Lug."*—Leaves of good size, quality and texture, but with some small imperfections—tied in hands containing ten leaves.

*Third Grade, "Thrash."*—The remainder of the leaves—tied in hands containing twelve leaves. The "hands," when tied, were put on the tobacco stick, which was placed in a notch in the table beside the tier.

When tying the leaves into hands it is important that the tie-leaf should be folded so as to be not more than one inch in width and neatly wrapped round the butts of the leaves and the end tucked away between them.

At the end of the day's work the sticks on which the hands were hanging, were taken to the curing barn and dried out at a temperature of 90° for three or four days.

The hogsheds for tobacco vary in size, an average being about 56 inches high, by 42 inches in diameter at the

#### **Prizing.**

head. When it is proposed to pack the tobacco it is brought just so much into "case" that while the leafy portion is pliant, and can be handled without injury, the stem is brittle although bending slightly.

When in this condition the tobacco contains from 11 to 12 per cent. of moisture, which is the condition preferred by the manufacturers. Two courses of hands are placed round the hogshed with the heads of the hands pressed close against the sides of the hogshed.

Two courses are then placed at right angles to the previous courses, and so on until the hogshed is filled, pressure being applied at intervals

by means of a screw jack. In the lower grades of tobacco, where the leaves do not fill the centre of the hogshead, it is necessary to fill the centre with hands, always taking care to keep each course level.

The hogsheads containing the tobacco should be kept in a dry place at a temperature of about 60°, in order that the tobacco may undergo a process of fermentation, which takes about three months.

This fermentation is a chemical process, believed to be due to the action of an "enzyme," and is necessary in order that the tobacco may "take flavour."

Up to the time of writing only three-fourths of the crop had been prized into hogsheads. The total yield on the 20 acres is estimated at 8,800 lbs., *i.e.*, 440 lbs. per statute acre.

The tobacco has been inspected by several leading tobacco manufacturers, and samples have been submitted to experts both in this country and America. In every case a very favourable opinion has been expressed as regards its size, texture, colour, and burning qualities.

The opinion of experts in America to whom it has been submitted is that it is "first class."

The following is approximately the cost per statute acre of the various operations in the cultivation and curing of the crop grown this year :—

	£	s.	d.
30 tons farmyard manure, at 2/6,	3	15	0
Carting and spreading,	1	5	0
Ploughings,	1	5	0
Cultivating,	0	18	0
Artificial manures,	2	0	0
Planting and watering,	1	4	0
Hoeing (hand),	0	13	0
Hoeing (horse),	0	4	0
Suckering and topping,	0	9	0
Harvesting,	1	15	0
Sorting,	1	12	0
Prizing,	0	6	0
Coal, 60 days, 5 cwt. per day for 20 acres,	0	10	0
Engine driver at 15/- per week,	0	6	0
Rent and taxes,	1	8	0
	17	10	0

Taking the average yield to be 440 lbs. per statute acre, the refund of one-third of the duty, *i.e.*, 1s. per lb., which the grower is allowed

by the Treasury, amounts to £22 per statute acre. The crop has been variously valued at from 4d. to 6d. per lb., which, assuming the value is 4d. per lb., gives a further return of £7 6s. 8d. per acre.

The total net profit per statute acre therefore amounts to £11 16s. 8d.

Of the 20 acres placed under tobacco in this experiment only one-third was of a type which seems capable of producing a maximum yield, besides which only two acres of the variety found to give the best results, viz., "Blue Prior," were planted.

In view of the fact that the crop had to be cultivated and handled by inexperienced workmen, it was thought safer, in the absence of expert advice and superintendence, to plant less than one-half of the plants that could have been grown per statute acre.

Having regard to the above facts, the result of this, the first experiment of growing tobacco on a commercial scale in Ireland, must be regarded as highly satisfactory.

The most encouraging feature in this experiment, however, is the universal praise of the quality and texture of the tobacco accorded by tobacco manufacturers and experts, both at home and in America; and given a continuance of the rebate, the prospects of tobacco culture in Ireland seem most encouraging.

With the experience gained this year a crop of tobacco grown on suitable land should reach 1,000 lbs. per statute acre. This result, after deducting the interest on barns necessary for the curing and the handling of the leaf, and cost of cultivation, would leave a profit so much in excess of that obtainable from any other crop that farmers might be induced to till more extensively, and the increased employment thereby given would tend to stem the tide of emigration from Ireland.

A great advantage, also, in the cultivation of tobacco, is the manner in which it fits into the routine of farm work, the planting being done between the turnip sowing and the cutting of the early meadows, and the cutting and housing between the corn harvest and the raising of the potato crop. The stripping, sorting and prizing can be carried out at any time during the winter, and thus provide much needed employment during a time when remunerative labour is difficult to find for farm hands, especially women and boys.

R. W. EVERARD.

*[It should be distinctly understood that permission for the growing of tobacco in Ireland is confined to the cases of the persons selected for the purpose of working the Department's experiments.—ED.]*

## THE PACKING OF BUTTER.

The important part that proper packing plays in the marketing of butter can hardly be exaggerated. This is a point to which the judges in the Department's Surprise Butter Competitions\* have frequently called attention; indeed, defective packing was one of the gravest faults they had to complain of in the parcels of butter submitted to them. Experience, too, has proved that in the present condition of English markets the packing of butter has a considerable influence on the price received. In this connection it may be noted that different markets require different methods of packing. Inquiry as to package desired should therefore be made before arranging for the despatch of butter.

If butter is to be properly packed it is essential that a clean, dry, well ventilated and well lighted store be available for the materials used in the various packages. Damp and dirty stores frequently cause mouldy growths on the timber and parchment, and much injury may thus be done to the butter packed in such materials.

The wood used for butter packages should be thoroughly seasoned and free from odour. For this reason it is recommended that all packages should be made up and well aired some time before their use. If, after all precaution has been taken, the wood has a strong odour, the bad effects may be lessened by heating the package thoroughly, and painting the interior with a thin coating of melted paraffin wax, using a soft brush for the purpose.

Each package should contain as nearly as possible the quantity required to fill it, as considerable inconvenience and frequent loss are occasioned by the use of insufficiently filled packages. A filled package travels better than one with room to spare.

Kiels should weigh not less than 14 lbs. each, and kegs not less than 7 lbs. The grooves for the lid and bottom should be well sunk, and the ends of the staves around the lid suitably bevelled off. The heads and bottoms should be made of strong well seasoned timber.

\* See *Journal*, Vol. IV., No. 3, page 555, and Vol. V., No. 2, page 372.

## THE PACKING OF BUTTER.



FIG. 1.—The two kiels and the keg on the left have "notched" or "locked" hoops; those on the right have twigged hoops.

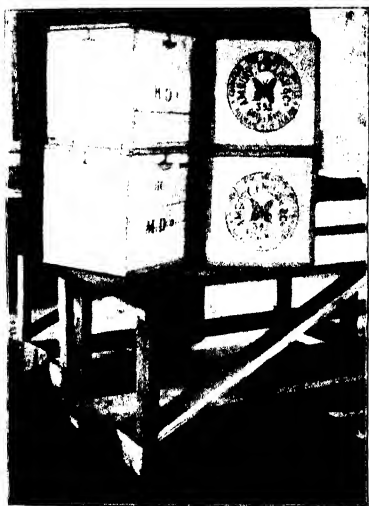


FIG. 2.—On the left are two Canadian boxes dovetailed at the corners. The lids are held by four bent nails which turn into the grooves shown. They are thus easily taken off or put on. On the right are two New Zealand boxes with the sides in one piece.

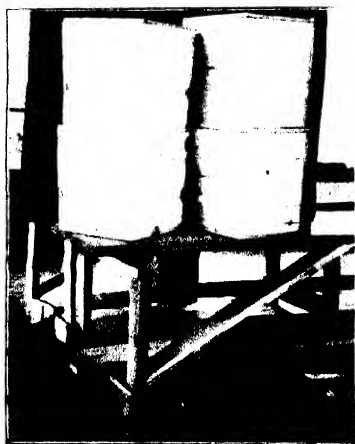


FIG. 3. On the left are two boxes whose sides are made of two pieces. The joints are marked to show the "break." On the right are two boxes with two sides made up of three pieces, with joints marked to show the "break." The distance between the joints is from  $3\frac{1}{2}$  to 4 inches.



## THE PACKING OF BUTTER.

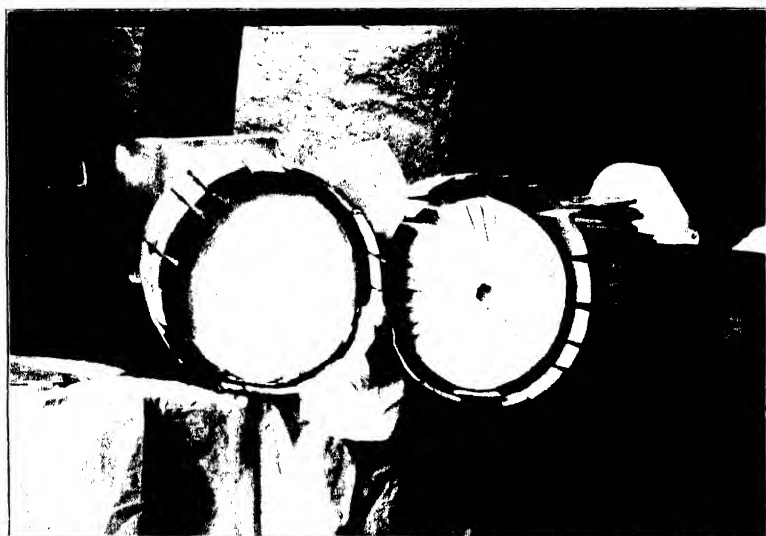


FIG. 4.—Two kielbasa turned so as to show the finish of the top. The one on the left is slovenly; that on the right neatly done.



FIG. 5.—Four pyramids turned over to show finish of tops. The lower one on the left has a neat finish; the others show a slovenly make-up.

There are two methods of finishing the hoops :—(1) *twigging* ; (2), *notching* or *locking*. The “notched” hoops are preferred because of their neater appearance. For “twigging” straight half hoops can be conveniently used, but the rods of which they are made should be of three years’ growth for kiels, and two years’ growth for kegs. The binding should be finished off neatly.

The hoops used for the “notching” method must have been previously “coiled” or “curled,” straight materials for these hoops are unsuitable. For kiels the 6-ft. coiled half hoops or half hoops from rods of three years’ growth, and for kegs 5-ft. coiled half hoops or half hoops from rods of two years’ growth are recommended. The packages are quarter bound, and twelve hoops are recommended. Very strong “quarter” hoops are unsuitable, being, as a rule, badly “shaped,” and they do not grip the staves securely.

The properly made notched kiel or keg will stand a long journey and be suitable for re-coopering if necessary in the merchant’s stores, and will preserve its neat and clean appearance. Short nails may be used to secure the top and bottom hoops in position. None are needed in the other hoops, provided they are properly coopered on. Long nails tear the parchment and cause rust spots on the butter.

Timber for these should, as far as possible, be free from loose knots and resin ; and the pieces tongued and grooved,

**Boxes or Pyramids.** planed both sides,  $\frac{5}{8}$ ths inches scantling for 56 lbs. and  $\frac{1}{2}$ -inch for 28 lb. boxes. The boards should be accurately cut in order that the box when made shall be close in all joints, and without any portions of projecting wood at the angles, and as nearly watertight as possible.

Timber cut for making boxes at creameries should be supplied of specified scantling, and if the sides consist of more than one piece, it should be of such widths that when the box is made there shall be alternation in the sides of wide and narrow boards, thus preventing the weakening of the box by having the joints of the sides too near each other at the angles when the box is nailed. Inattention to this principle renders probable a liability of the upper portion of boxes being parted from the lower through the rough handling they receive in transit.

The most suitable nails for the sides of the 56 lb. pyramid box are cement coated steel wire nails,  $2\frac{1}{2}$ -inch by 11 gauge. Eight nails at least should be used in each side, and of these at least two in the break.

For the bottom and top,  $1\frac{1}{2}'' \times 12$  gauge nails are suitable, six in the ends, and in the case of the bottom two additional nails into each side. Boxes dovetailed at sides and without nails are recommended where suitable timber can be obtained at a reasonable cost.

Clips and handles are not necessary for the present system of carrying butter when the boxes are made of sufficient strength and stability.

#### **The use of Clips.**

#### **Handles and Canvas**

#### **Covers.**

The box should be wrapped in a canvas cover in order to protect it from dirt in transit. A few buyers however, have expressed a preference for uncovered boxes, giving as reasons, (1) that the carriers use the covers as a sling to throw the boxes in place of lifting them; (2), that when no covers are used the damaged boxes in a consignment are more readily seen and claims can be made at once. Covers, if used, should accordingly be wrapped tightly and closely on to the box, and so secured that the carriers cannot use them as a sling.

In order to reduce the liability of taint from the wood of packages, it is advisable to use a lining of strong, heavy vegetable parchment paper. This should be made from rags only, and should be pure white in colour, all tints are objectionable; it should also be free from filling or weighting material. The texture should be even, and bright shining specks (due to holes in the paper), should not be visible when a sheet is held between the eyes and a moderate light. A suitable parchment paper should not show fibre on a torn edge. When wet it should be quite as tough as when dry and should stretch on pulling. For kiels a parchment paper is required, weighing not less than 35/40 lbs. per ream of 480 sheets, each measuring  $30'' \times 20''$ ; the same weight, but cut to  $20'' \times 26''$  is necessary for 56 lb. pyramids.

The kiel, keg, or box should be thoroughly scalded over a steam jet, and afterwards scrubbed on the inside with clean cold salt and water. The parchment cut to a suitable size should be steeped in scalding brine the night before it is to be used, and allowed to remain in the brine till next morning when it will be cold and ready for use. The package should be carefully lined with the damp parchment paper, avoiding creases and bare spaces.

The quantity of butter to be put into the packages should be weighed out accurately, allowing  $\frac{1}{2}$  lb. extra for a 56 lb.

**Filling the Packages.** package and 1 lb. for a 112 lb. package Small quantities only should be put in at a time, and should be well pressed against the sides and into the corners by a heavy packer. Great care should be taken against creasing the parchment. The butter, when turned out on the shop counter, should be perfectly solid and smooth, without holes or crease marks, and showing clean angles. The top should be finished off smooth and flat, and carefully covered with a neatly fitting piece of parchment paper.

A considerable demand exists for butter made up in Prints, Rolls, Bricks, etc., weighing  $\frac{1}{2}$  lb., 1 lb., or 2 lbs., and

**Butter in Prints, Rolls, Bricks, etc.** high prices are obtained for butter thus made up. The retailer incurs no loss through cutting up, and saves the time and labour of having to do so.

It is essential that the butter for these packages should have a firm texture and be free from loose moisture.

The weight of each piece should just turn the scale. Short weights may involve your customer in trouble and be a source of vexatious claims; while, on the other hand, 4 to 6 lbs. per cwt. may be lost in making up through over weight. The best plan is to decide what allowance is to be made, say 1 lb. per cwt. for 1 lb. bricks, and 2 lbs. per cwt. for  $\frac{1}{2}$  lb. bricks. Then weigh out sufficient butter to make a definite number of the prints, etc. and check the weighing occasionally. With weak textured butters, losses of 6 to 8 lbs. per cwt. may easily occur through carelessness in cutting up. If large quantities have to be made up a moulding machine, such as Bradford's, for bricks, and Lister's, for rolls, is useful for shaping. A piece of wet muslin, stretched over the bench, gives the best surface to shape on.

The packages for butter in smaller lots, such as rolls, bricks, prints, etc., are, as a rule, made of "smooth sawn timber," and are not planed.

Prints are usually packed in boxes containing 12 or 24 of 1 lb. or  $\frac{1}{2}$  lb.; each print should be neatly moulded and im-

**The Packing of** pressed with a distinctive sharply outlined "Prints and Bricks." device and wrapped in parchment. The boxes should have a separate division, lined with grease-proof paper, for each print. This method of packing is not suit-

able for a cross-Channel trade owing to the rough handling the packages receive in transit, but is useful for the Irish trade.

1 lb. and  $\frac{1}{2}$  lb. bricks (often called rolls) are wrapped in parchment paper, and, as a rule, put into folding cardboard boxes (cartons). The long-shaped brick is preferred by the retailer, being readily divided into halves or quarters. The cartons are packed carefully on end in the box which should hold the exact number without leaving room for shaking in transit. The parchment paper should be of the same quality as that for kiels, but of a lighter weight, 25/30 lbs. to the ream of 480 sheets, 20 inches by 30 inches. It can be purchased cut in squares of exact size for packing and with any suitable device printed on it. The cartons may be sealed by a gummed slip stating whether the butter is "Fresh," "Mild," or "Salt," and with the registered trade mark of the creamery on it.

When the bricks are wrapped in parchment paper only they are laid flat in the box, and with the printed side up. The box should be lined with a grease-proof paper, and a piece of paper with a fancy perforated lace edging may be pasted around the top edges of the box, and folded over. The packages may be sealed by passing a cord round the box and through holes in the side and lid, the ends of the cord being fastened by a lead seal.

The size of boxes recommended are those that hold 54, 24, and 12 bricks per box.

Butter in  $\frac{1}{2}$  lb. "Rolls" is packed in long cylindrical rolls and put up in 24 by  $\frac{1}{2}$  lb. or 12 by  $\frac{1}{2}$  lb. packages.

**$\frac{1}{2}$  lb. "Rolls."** Each roll is wrapped in parchment and then placed crosswise in a box lined with grease-proof paper and having four pieces of paper with perforated fancy lace edging pasted on to the inside edge of the box and folded over.

The dimensions of the boxes are :—24 by  $\frac{1}{2}$  lb. size,  $9\frac{3}{4}$  inches by  $6\frac{1}{2}$  inches by  $7\frac{1}{8}$  inches ; 12 by  $\frac{1}{2}$  lb. size,  $9\frac{3}{4}$  inches by  $6\frac{1}{4}$  inches by  $3\frac{3}{4}$  inches ; scantling,  $\frac{1}{4}$  inch.

Two pound "Rolls" are usually packed for the London market one dozen in a box. No wrapping material of any

**2 lb. "Rolls."** kind should be placed round a roll. The box is first lined with a good grease-proof paper with lace edging to fold over, then a layer of good muslin. The rolls, which should be made narrow at each end, or torpedo shape, and  $\frac{1}{4}$ -inch

## THE PACKING OF BUTTER.



FIG. 6.—A very badly packed pyramid box of butter turned out, showing gaps and holes.

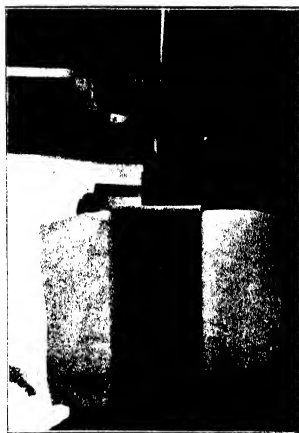


FIG. 7.—Box of 24  $\times \frac{1}{2}$  lb. rolls without the neat lace edging.

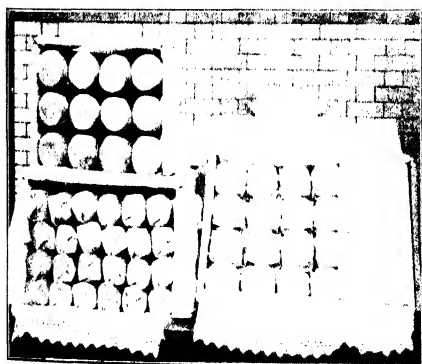


FIG. 8.—The upper box on the left contains 12  $\times$  2 lb. rolls; the lower box on the left 1 lb. rolls on end—this box is a little large. On the right is a box of prints. Note the perforated paper edging, which gives a neat appearance to the packages.

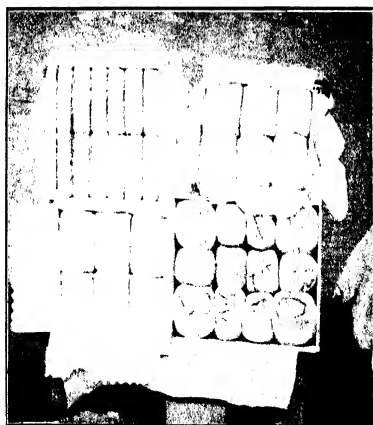


FIG. 9.—Top box on left contains 24  $\times$  1 lb. rolls; the bottom box contains 4 lb. lumps wrapped in muslin. On the right the upper basket contains 3 lb. lumps wrapped in muslin, and the lower box 3 lb. lumps wrapped in muslin.

## THE PACKING OF BUTTER.



FIG. 10.—This is supposed to be a box of 12  $\times$  2 lb. rolls. The butter is made up in brick shape, and owing to the box being too large the butter has shaken together.

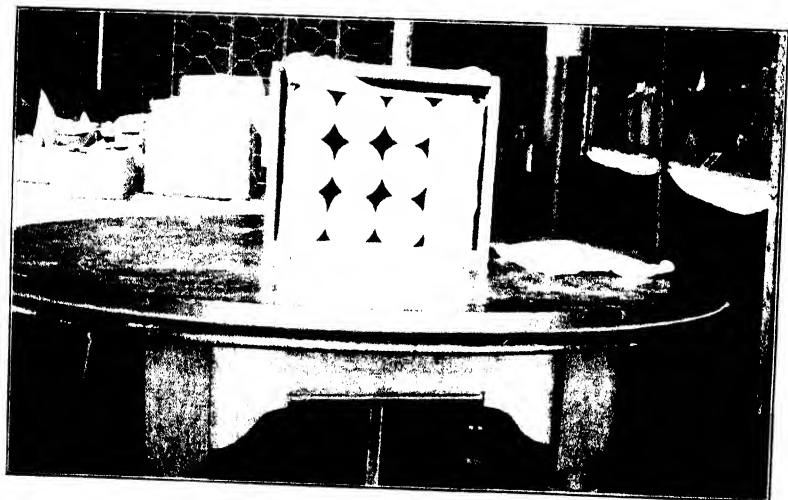


FIG. 11.—Box of 12  $\times$  2 lb. rolls. The rolls are fairly well shaped, but the box is far too large.

to  $\frac{1}{2}$ -inch longer than the depth of the box, are packed on end, the muslin folded over and a board pressed on the ends of the rolls till it meets the sides of the box, the grease-proof paper is then folded over and the lid nailed on. By making the rolls slightly longer than the box it is found that they retain their shape and travel better. The dimensions of a box are :—

$12\frac{1}{8} \times 9\frac{1}{8} \times 7$  inches, and scantling  $\frac{5}{8}$  inches.

Branding should be clear and sharp and should indicate the source of origin, character of the butter and registered trade

**Branding and** mark of the dairy. Stencilling a brand is not  
**Labelling.** satisfactory, as the lettering, when unsuitable ink is used or when the box is too soon handled,

is apt to "smudge" or run. Hot iron, or printing, brands should be used. The latter for hand use are inexpensive, and with these it is possible to use two colours in branding. In all cases it is advisable to put the registered trade mark of the creamery on the package.

Labels should be attached securely to the package by means of  $\frac{1}{4}$ -inch tin tacks, which should be no longer in order that they may not pass through the lid and injure the contents.

The whole aim of the packer should be to produce a filled package which, by its neatness, will attract the attention of buyers to the contents and assist in building up a reputation for the brand.

A. POOLE WILSON.



## FIELD EXPERIMENTS, 1904.\*

## I.—MEADOW HAY.

The experiments on the manuring of meadow hay in 1904 were exactly similar to those of the three preceding years. They were carried out at sixteen centres in the counties of Carlow, Cavan, Down, Kildare, Londonderry, Sligo, Wexford, and Wicklow.

The plan of the experiment, with full details as to centres, manures applied, yield per acre, and estimated profits, is given on Table I.

The following table summarises the results obtained:—

Plot No.	Manures Applied per Statute Acre.	Average yield of Hay per Statute Acre.	Increase due to Manures.	Value of Increase at 2s. 6d. per cwt.	Cost of Manures.	Estimated profit per Statute Acre.
		T. C. Q.	T. C. Q.	£ s. d.	£ s. d.	£ s. d.
1	No manure. ... ..	1 8 1	—	—	—	—
2	Ten tons farmyard manure.	1 19 3	0 11 2	1 8 9	2 0 0	0 11 3 (Loss).
3	One cwt. Nitrate of Soda, 2 cwt. Superphosphate, 2 cwt. kainit.	2 3 3	0 15 2	1 18 9	1 2 0	0 16 9
4	One cwt. Nitrate of Soda, 2 cwt. Superphosphate.	1 10 0	0 10 3	1 6 9	0 17 0	0 9 9
5	One cwt. Nitrate of Soda.	1 13 2	0 5 1	0 12 0	0 10 6	0 1 6

The hay crop in 1904 was, on the whole, somewhat lighter than in 1903, consequently, as there was the same outlay in manures, the profits obtained from their use were proportionately less than in the previous year. The figures in the table on page 486 show that on the average of all the centres the heaviest yield of hay was obtained on plot 3, to which was applied, at the rate of 5 cwt. per acre, a mixture containing each of the three important ingredients of manures, viz., nitrogen, phosphates, and potash. This is true not only of the average results, but also of the results obtained at each individual centre, with the exception of three or four. In these cases the highest yield was produced on plot 2, which was manured with farmyard manure at the rate of 10 tons per acre.

The general result, therefore, indicates that the mixture applied on plot 3 may be relied on to give a substantial, and, in most cases, a profitable increase in the crop.

\* The Report on the Barley Experiments of 1904 appeared in No. 2, Vol. V., of the *Journal*. See p. 264 of that issue.

On plot 4 the same mixture, but without the kainit, was applied, and in a few cases this was more profitable than the complete mixture. Such a result may be expected on land which is in good heart; but even then the increase in the hay crop does not fully represent the advantages derived from manures containing potash, as these are also seen in the aftergrass where the growth of clovers and bottom grasses is stimulated by the use of such manures.

The use of nitrate of soda alone on plot 5 resulted in a profit of only 1s. 6d. per acre, and is not to be recommended except under very exceptional circumstances.

The 10 tons of farmyard manure applied on plot 2 gave on the average the satisfactory increase of 11½ cwt. per acre, and, as mentioned on page 484, in a few cases yielded the heaviest crop.

If the hay crop is charged with the full cost of the manure (4s. per ton) a loss of 11s. 3d. per acre is incurred; but if, on the other hand, only half the cost is charged to the hay crop, a profit of 8s. 9d. per acre is obtained.

The following table shows briefly the results obtained during the past four seasons:—

Manures applied per Statute Acre.	1901.		1902.		1903.		1904.	
	Average yield per acre.	Esti- mated profit per acre.	Average yield per acre.	Esti- mated profit per acre.	Average yield per acre.	Esti- mated profit per acre.	Average yield per acre.	Esti- mated profit per acre.
No manure, ...	T. C. Q. 1 8 2	£ s. d. —	T. C. Q. 1 10 0	£ s. d. —	T. C. Q. 1 9 0	£ s. d. —	T. C. Q. 1 8 1	£ s. d. —
Ten tons farmyard manure.	1 18 2	0 15 0 (Loss)	1 19 2	0 14 4 (Loss)	2 1 2	0 8 9 (Loss)	1 19 3	0 11 3 (Loss)
One cwt. Nitrate of Soda, 2 cwt. Super- phosphate, 2 cwt. Kainit.	2 8 3	1 8 6	2 6 2	1 1 0	2 7 2	1 4 3	2 3 3	0 16 9
One cwt. Nitrate of Soda, 2 cwt. Super- phosphate.	2 5 0	0 19 3	2 0 2	0 11 0	2 2 2	0 16 9	1 19 0	0 9 9
One cwt. Nitrate of Soda.	1 16 3	0 10 0	1 14 3	0 3 3	1 15 0	0 4 6	1 13 2	0 1 6

The above table shows that in each year the heaviest yield and the greatest profit have been obtained from plot 3, and farmers may therefore be recommended to apply to their meadow lands the following mixture per statute acre:—

- 1 cwt. nitrate of soda,
- 2 cwt. superphosphate,
- 2 cwt. kainit.

## MEADOW HAY EXPERIMENT:—MANURIAL TEST FOR ONE YEAR.

Table showing the Returns per Statute Acre from each Centre.

Name and Address of Farmer.	County.	Character of Soil.	Plot 1. No Manure.	Plot 2. 10 tons Farm-yard Manure.	Plot 3. 1 cwt. Nitrate of Soda, 2 cwt. Superphosphate, 2 cwt. Kainit.	Plot 4. 1 cwt. Nitrate of Soda, 2 cwt. Superphosphate.	Plot 5. 1 cwt. Nitrate of Soda.
			T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.
Mrs. Kirwan, Borris.	Carlow.	Clay loam.	1 15 2	3 1 2	2 13 1	1 16 3	1 13 1
M. Roche, Clonmore.	"	Loam.	1 3 0	1 16 2	1 16 2	1 13 2	1 8 0
G. B. Donald, Bagnalstown.	"	Clay loam.	0 19 0	1 18 2	1 14 2	1 6 0	0 18 0
Rev. R. D. Martin, Killeshandra.	Cavan.	Stiff wet clay.	1 10 0	1 13 0	2 5 0	1 15 0	1 10 0
S. Boyd, Holywood.	Down.	Clay loam.	0 16 0	1 1 3	1 4 2	1 3 3	1 3 0
Jas. Kelly, Rathbride.	Kildare.	Strong loam.	1 9 2	2 5 3	2 5 2	2 4 0	1 16 2
R. M'Cormac, Carbury.	"	Strong clay.	2 1 3	2 7 3	2 15 2	2 12 1	2 8 0
Jas. Flynn, Rathangan.	"	Limestone gravel.	1 12 1	2 2 0	2 10 2	2 5 0	2 0 1
J. Kennedy, Macleary.	L'derry.	Medium loam.	1 7 3	2 6 1	1 18 0	1 10 2	1 10 0
B. Foley, Ballindoon.	Sligo.	Moory.	1 10 1	2 3 2	2 6 3	2 3 0	2 2 0
— Malooney, Collooney.	"	Moory.	1 12 0	1 19 0	2 19 0	2 10 0	2 1 0
Michael Doyle, Tagoat.	Wexford.	Clay loam.	0 19 0	1 8 1	1 15 3	1 16 2	1 8 2
H. A. Lett, Enniscorthy.	"	Loam.	1 15 3	2 5 3	2 10 1	2 11 2	2 6 0
L. Cullen, Ashford.	Wicklow.	Sandy.	1 7 2	1 16 0	2 8 2	2 0 2	1 14 1
J. Brennan, Ovoca.	"	Light loam.	1 13 2	2 0 1	2 8 1	2 6 2	1 15 3
L. Murphy, Roundwood.	"	Sandy.	0 19 0	1 9 3	1 8 0	1 7 2	1 2 0
Average yield per statute acre.	—	—	1 8 1	1 19 3	2 3 3	1 19 0	1 13 2
Increase due to Manures.	—	—	—	0 11 2	0 15 2	0 10 3	0 5 1
Value of Increase: Hay at 2s. 6d. per cwt.	—	—	—	£ s. d. 1 8 9	£ s. d. 1 18 9	£ s. d. 1 6 9	£ s. d. 0 12 0
Cost of Manures.	—	—	—	2 0 0	1 2 0	0 17 0	0 10 6
Estimated profit per statute acre.	—	—	—	0 11 3 (Loss.)	0 16 9	0 9 9	0 1 6

*Copies of this article in leaflet form (No. 37) may be obtained, free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.*

## II.—POTATOES.

## A.—MANURIAL TEST.

The experiments on the manuring of potatoes carried out in 1904 were exactly similar to those of the three preceding years. The object of these experiments, which have been fully explained in previous reports, may be briefly stated, as an attempt to indicate what use can be made of artificial manures by way of supplementing applications of farmyard manure to the potato crop.

In Table I. will be found the complete results of the experiments conducted at thirty-two centres in Counties Antrim, Armagh, Carlow, Cavan, Down, Londonderry, Kilkenny, Tipperary, Waterford, Wexford and Wicklow. In each county the experiments were under the direct supervision of the county agricultural instructor.

While the results obtained at individual centres will repay careful study, especially in view of the fact that the character of the soil and the variety of potato grown at each is given, yet, when drawing general conclusions, it will be safer to be guided in the main by the average results. For the sake of easy reference these are reproduced in the following table:—

Plot.	Manure applied per Statute Acre.	Average Total Yield of Potatoes per Statute Acre.		Increase due to Manures.		Cost of Manures		Estimated Profit per Statute Acre.*	
		Tons.	Cwt.	Tons.	Cwt.	£	s. d.	£	s. d.
1	No Manure.	3	12	—	—	—	—	—	—
2	20 tons Farmyard Manure.	8	14	5	2	4	0 0	5	19 0
3	15 tons Farmyard Manure.	7	16	4	4	3	0 0	5	4 0
4	15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia.	8	10	4	18	3	12 6	5	17 6
5	15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate.	9	9	5	17	4	5 6	6	19 6
6	15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate, 1 cwt. Muriate of Potash.	10	9	6	17	4	16 0	8	10 0

In calculating the profits obtained the following prices have been assigned to the different manures:—Farmyard manure, 4s. per ton; sulphate of ammonia, £12 10s. per ton; superphosphate, £3 5s. per ton; and muriate of potash, £10 10s. per ton.

The following is an extract from last year's report with reference to a similar table:—

"The figures in the above table indicate—first, that each application of manure has produced a large increase in the crop; second, that the application of 15 tons farmyard manure has produced a crop which is not three-quarters of a ton less than that produced by the application of 20 tons farmyard manure; and third, that on each of the plots, 4, 5, and 6 the addition of artificial manures to the lighter dressing of dung has yielded a larger crop than the heavier dressing of dung yielded."

\* The value of saleable potatoes is taken at £2 per ton, and of the small potatoes £1 per ton.

With two very slight modifications these remarks are equally true of the results now under consideration. These two modifications are:—(1.) That the application of 15 tons farmyard manure has produced a crop which is *only* 18 *cwt.* less than that produced by the application of 20 tons farmyard manure; and (2.) that on plot 4 the addition of 1 *cwt.* sulphate of ammonia to the lighter dressing of dung has yielded *only* 4 *cwt.* less than the heavier dressing of dung.

These differences are so small that they may be disregarded, and it may without hesitation be said that the results of the two years' experiments are corroborative.

In considering the question of monetary return it may be urged, and justly so, that it is a mistake to charge the potato crop with the full value of the farmyard manure. But whether the full value, or only half of the value, of the farmyard manure is charged to the potato crop, the result is the same, viz., the use of artificial manures along with 15 tons farmyard manure has, except on plot 4, left a greater return per acre than the use of 20 tons farmyard manure alone. The combination of manures as applied on plot 4 (farmyard manure and sulphate of ammonia) is not one which could be recommended for potatoes under any circumstances, and it is well, therefore, that it should provide the exception to the above statement.

These experiments seem to fully justify the advice given in previous reports that, as a general rule, and especially where farmyard manure is limited in amount, farmers should apply the latter in more moderate quantities, and supplement it with suitable artificial manures. Now the question arises—What are the "suitable" artificial manures? An answer is furnished from the figures contained in the following table:—

Plot.	Manure applied per Statute Acre.	Total Yield of Potatoes per Acre.		Increase over yield from 15 tons Dung.		Cost of Manures in excess of 15 tons Dung.			Estimated Profit from use of Artificial.		
		Tons.	Cwt.	Tons.	Cwt.	£	s.	d.	£	s.	d.
3	15 tons Farmyard Manure.	7	15	—	—	—	—	—	—	—	—
4	15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia.	8	10	0	14	0	12	6	0	13	
5	15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate.	9	9	1	13	1	5	6	1	15	
6	15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate, 1 cwt. Muriate of Potash.	10	9	2	13	1	16	0	3	6	0

These figures show that the most suitable mixture of artificial manures that can be used to supplement a moderate application of dung is one which is complete, or, in other words, one which contains nitrogen, phosphoric acid and potash. The questions as

to what quantity of each ingredient the mixture should contain, and in what form each ingredient should be present, may well constitute subjects for future investigation, but in the meantime farmers may safely be urged to try the mixture as applied to plot 6. This conclusion is very considerably strengthened when the results of last year's experiments are compared with those of similar experiments conducted during the three previous years. as given in the following table:—

Manures applied per Statute Acre.	1901.		1902.		1903.		1904.	
	Total Yield of Potatoes per Acre.	Estimated Profit from use of Manures.	Total Yield of Potatoes per Acre.	Estimated Profit from use of Manures.	Total Yield of Potatoes per Acre.	Estimated Profit from use of Manures.	Total Yield of Potatoes per Acre.	Estimated Profit from use of Manures.
	Tons. Cwt.	£ s. d.	Tons. Cwt.	£ s. d.	Tons. Cwt.	£ s. d.	Tons. Cwt.	£ s. d.
No Manure.	4 4	—	4 7	—	3 1	—	3 12	—
20 tons Farmyard Manure.	10 13	8 11 0	8 18	4 16 0	8 2	5 14 0	8 14	5 19 0
15 tons Farmyard Manure.	9 15	7 14 0	7 19	4 3 0	7 9	5 9 0	7 16	5 4 0
15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia.	10 16	8 2 6	8 19	5 6 6	8 6	6 8 6	8 10	5 17 6
15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate.	11 12	10 3 0	9 16	6 3 6	9 10	8 2 6	9 9	6 19 6
15 tons Farmyard Manure, 1 cwt. Sulphate of Ammonia, 4 cwt. Superphosphate, 1 cwt. Muriate of Potash.	12 1	10 1 0	10 11	7 5 0	10 5	9 2 0	10 9	8 10 0

#### B.—VARIETY TEST.

This experiment, designed to test the relative cropping capabilities of different varieties of potatoes, was conducted at twenty-one centres in Counties Antrim, Armagh, Carlow, Down, Kildare, Kilkenny, Sligo, Tipperary, Waterford, Wexford and Wicklow. The full returns of all the varieties grown at each centre are given in Table II., together with the average yield per statute acre, and that of the same varieties in similar experiments conducted in the three previous years.

As all the varieties were not grown at each centre an accurate comparison between them cannot be drawn from the average figures stated in the table. "Up-to-Date" (grown at twenty centres) yielded the heaviest crop, next in order of yield coming "Beauty of Bute" (sixteen centres), and "Hibernia" (thirteen centres), followed by "Old Champion" (grown at all the centres), "Champion II." (eleven centres), and "Evergood" (nineteen centres). The lightest crop was obtained from "Black Skerries," but the excellent cooking qualities of this potato compensate to some extent for its failure to yield a heavy crop.

## POTATO EXPERIMENT :—

TABLE I.—SHOWING THE RETURNS PER

Name and Address of Farmer.	County.	Character of Soil.	Variety of Potato.	PLOT 1.		
				No Manure.		
				Saleable.	Small.	Total.
				tons. cwt.	cwt.	tons. cwt.
J. D. Wilson, Ballynure.	Antrim.	Medium loam.	Abundance.	5 3	75	8 18
B. Agnew, Bandalstown.	"	"	Up-to-date.	2 2	14	2 16
S. Russell, Croscannon.	"	"	"	0 7	11	0 18
A. Park, Glarryford.	"	"	"	3 13	5	3 18
C. Reid, Glarryford.	"	Peaty loam.	Black Skerries.	0 15	27	2 2
S. B. Knox, Ballymoney.	"	Medium loam.	Up-to-date.	2 12	20	3 12
Joseph Warden, Manoney.	Armagh.	Loam.	"	3 15	15	4 10
G. Bartholomew, Loughgall.	"	"	"	3 0	20	4 0
F. Shepherd, Markethill.	"	"	"	5 14	22	6 16
R. Watson, Crossmore.	"	Light loam.	"	1 0	4	1 4
G. Rice, Mullabawn.	"	"	Beauty of Bute.	4 0	15	4 15
N. Cosgrove, Clonegal.	Carlow.	"	Champion.	5 1	18	6 19
M. Fitzpatrick, Pentland.	"	Clay loam.	"	1 12	6	1 18
T. Byrne, Glynn.	"	Sandy loam.	"	1 4	6	1 10
J. Smith, Coolnacola.	Cavan.	Poor clay.	Champion.	1 13	35	3 7
D. O'Leary, Timoleague.	Cork.	Light loam.	Up-to-date.	2 10	22	3 12
J. Fletcher, Hillsborough.	Down.	Sandy loam.	Black Skerries.	1 2	7	1 9
S. Prentice, Killinchee.	"	Loam.	Up-to-date.	3 10	45	5 15
R. Guthrie, Sheephill.	Derry.	Medium loam.	"	5 1	32	6 13
J. M'Farland, Turmeil.	"	Gravel loam.	Champion.	5 0	37	6 17
P. Brennan, Freshford.	Kilkenny.	Limestone loam.	"	0 13	27	2 0
J. Staunton, Attanagh.	"	Clay loam.	"	0 17	27	2 4
Nenagh Rural District Council.	Tipperary.	Light loam.	Beauty of Bute.	1 5	20	2 5
S. Liffey, Cloughjordan.	"	Loam.	Empress Queen.	0 4	12	0 16
J. Wolfe, Rockford.	"	Loam.	Langworthy.	3 12	15	4 7
G. O'Leary, Nenagh.	"	Light loam.	Empress Queen.	0 11	16	1 7
G. H. Dennehy, Clashmore.	Waterford.	Loam.	Maincrop.	1 13	17	2 10
E. Murphy, Ballyneil.	"	"	Champion.	3 10	33	5 3
T. Webster, Gorey.	Wexford.	Gravelly clay.	"	2 9	7	2 16
M. Redmond, New Ross.	"	Light gravelly.	"	1 3	5	1 8
P. J. Byrne, Ashford.	Wicklow.	Medium loam.	Evergood.	4 4	47	6 11
J. Brennan, Ovoca.	"	Light loam.	"	3 16	4	4 0
Average yield per statute acre.				2 11	21	3 12
Increase due to Manures.				—	—	—
Value of Increase: Saleable Potatoes, 2s. per cwt.: Small, 1s. per cwt.				—	—	—
Cost of Manures.				—	—	—
Estimated profit per statute acre.				—	—	—

## MANURIAL TEST.

## STATUTE ACRE FROM EACH CENTRE.

PLOT 2.			PLOT 3.			PLOT 4.			PLOT 5.			PLOT 6.		
20 tons Farmyard Manure.			15 tons Farmyard Manure.			15 tons Farmyard Manure. 1 cwt. Sulphate of Ammonia.			15 tons Farmyard Manure. 1 cwt. Sulphate of Ammonia. 4 cwt. Superphosphate.			15 tons Farmyard Manure. 1 cwt. Sulphate of Ammonia. 4 cwt. Superphosphate. 1 cwt. Muriate of Potash.		
Saleable.	Small.	Total.	Saleable.	Small.	Total.	Saleable.	Small.	Total.	Saleable.	Small.	Total.	Saleable.	Small.	Total.
tons, cwt.	cwt.	tons, cwt.	tons, cwt.	cwt.	tons, cwt.	tons, cwt.	cwt.	tons, cwt.	tons, cwt.	cwt.	tons, cwt.	tons, cwt.	cwt.	tons, cwt.
10 12	20	11 12	9 8	34	11 2	8 17	33	10 10	10 10	40	12 10	11 3	53	13 16
12 8	17	13 5	11 6	17	12 3	11 19	20	12 19	12 10	15	13 5	13 1	13	13 14
11 19	19	12 18	9 14	30	11 4	10 13	19	11 12	11 7	25	12 12	14 0	21	15 1
9 11	20	10 11	7 4	19	8 3	8 1	14	8 15	10 12	30	12 2	15 2	16	15 18
7 17	24	9 1	6 12	22	7 14	6 19	29	8 8	4 18	44	7 2	5 19	32	7 11
10 14	29	12 3	10 11	30	12 1	11 12	26	12 18	11 18	36	13 14	12 18	34	14 12
10 11	12	11 3	9 8	22	10 10	9 13	15	10 8	11 10	12	12 2	14 11	16	15 7
7 16	21	8 16	6 8	23	7 11	6 0	20	7 0	7 15	30	9 5	7 10	20	8 10
10 4	37	12 1	9 15	42	11 17	9 12	51	12 3	11 14	39	13 13	11 1	39	13 0
4 4	6	4 10	4 0	6	4 6	4 0	7	4 7	6 0	6	6 6	6 10	8	6 18
6 0	17	6 17	4 19	16	5 15	5 8	15	6 3	5 2	17	5 19	6 13	22	7 15
5 16	34	7 10	5 11	27	6 18	6 11	40	7 11	7 1	29	8 10	8 16	35	10 11
5 1	36	6 17	4 16	22	5 18	5 1	33	6 14	5 10	35	7 5	6 10	36	8 6
3 9	15	4 4	3 1	17	3 18	4 7	18	5 5	4 3	25	5 8	5 3	23	6 6
7 17	60	10 17	6 2	50	8 12	7 7	50	9 17	7 17	60	10 17	9 0	57	11 17
11 0	38	12 18	10 15	35	12 10	13 0	38	14 18	13 7	30	14 17	13 10	39	15 9
8 1	13	8 14	7 16	11	8 7	8 2	14	8 16	8 4	15	8 19	9 4	14	9 18
12 10	19	13 9	10 10	18	11 8	11 17	30	13 7	12 9	25	13 14	12 13	18	13 11
11 3	47	13 10	9 15	48	12 3	10 4	50	12 14	10 0	43	12 3	11 15	40	13 15
9 3	29	10 12	8 11	21	9 12	8 7	31	9 18	8 4	34	9 18	9 0	24	10 4
4 18	39	6 17	3 18	45	6 3	4 18	53	7 11	6 3	53	8 16	6 17	45	9 2
3 6	23	4 9	2 18	21	3 19	3 5	23	4 8	4 0	35	5 15	5 10	32	7 2
3 17	24	5 1	3 12	18	4 10	4 3	20	5 3	4 5	14	4 19	5 10	12	6 2
4 8	25	5 13	4 12	23	5 15	4 11	31	6 2	5 5	25	6 10	6 2	22	7 4
6 2	22	7 4	5 10	20	6 10	6 10	19	7 9	7 6	24	8 10	7 2	20	8 2
3 4	18	4 2	2 8	17	3 5	2 14	18	3 12	2 10	24	3 14	4 6	18	5 4
4 9	30	5 19	3 19	32	5 11	5 6	22	6 8	5 13	21	6 14	5 16	22	6 18
5 10	47	7 17	5 6	46	7 12	4 17	62	7 19	5 1	68	8 9	6 8	71	9 19
5 17	21	6 18	5 2	15	5 17	5 15	18	6 13	5 16	23	6 19	5 16	22	6 18
4 6	14	5 0	2 19	8	3 7	3 11	6	3 17	6 18	11	7 9	5 19	20	6 19
7 10	18	8 8	6 16	18	7 14	8 19	28	10 7	11 15	28	13 3	14 12	37	16 9
7 10	37	9 7	6 7	27	7 14	7 10	18	8 8	9 8	33	11 1	10 7	47	12 14
7 8	26	8 14	6 11	25	7 16	7 3	27	8 10	7 19	30	9 9	9 0	29	10 9
4 17	5	5 2	4 0	4	4 4	4 12	6	4 18	5 8	9	5 17	6 9	8	6 17
£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
9	19	0	8	4	0	9	10	0	11	5	0	13	6	0
4	0	0	3	0	0	3	12	6	4	5	6	4	16	0
5	19	0	5	4	0	5	17	6	6	19	6	8	10	0



## POTATO EXPERIMENT:--

TABLE II.—SHOWING THE RETURNS PER

Name and Address of Farmer.	County.	Character of Soil.	Reliance.			Black Skerries.			Champion II.		
			Saleable.	Small.	Total.	Saleable.	Small.	Total.	Saleable.	Small.	Total.
D. J. MacMaster, Ballymoney.	Antrim.	Light loam.	15 2	30 16	12 8	14 11	9 5	10 13	14 11	7 7	
R. Kirkpatrick, Ballymoney.	"	Medium loam.	8 3	20 9	3 8	3 6	8 9	7 19	14 8	13 13	
W. Ledlie, Mullaghglass.	Armagh.	Light.	7 9	13 8	2 9	13 17	10 10	9 10	14 10	4 4	
T. J. Gilpin, Clannrolla.	"	Loam.	4 15	40 6	15 8	5 20	9 5	-	-	-	
P. Rice, Mullabawn.	"	Light.	4 13	23 5	16 5	6 13	5 19	8 0	10 8	10 10	
R. Watson, Crossmore.	"	Light.	2 0	15 2	15 1	10 5	1 15	6 18	3 7	1 1	
H. P. Earl, Rathvilly.	Carlow.	Limestone loam.	9 0	38 10	18 8	0 33	9 13	9 13	23 10	16 16	
J. Joyce, Borris.	"	Loam.	4 10	14 5	4 3	16 11	4 7	4 2	14 4	16 16	
W. S. Young, Kirkcubbin.	Down.	Gravelly loam.	-	-	-	-	-	-	-	-	
Thos. McCreedy, Newtonarda.	"	Loam.	-	-	-	-	-	-	-	-	
P. Bradley, Hilltown.	"	Loam.	-	-	-	-	-	-	-	-	
S. Prentice, Killinchy.	"	Loam.	-	-	-	-	-	-	-	-	
P. McDonald, Canagh.	Kildare.	Clay.	4 10	22 5	12 7	4 16	8 0	-	-	-	
J. Dalton, Piltown.	Kilkenny.	Strong clay.	-	-	-	2 13	26 3	19 4	7 53	7 0	
E. Cogan, Castlecomer.	"	Medium loam.	-	-	-	2 13	17 3	10 4	9 34	6 3	
T. P. Brennan, Achonry.	Sligo.	Sharp loam.	-	-	-	6 13	29 8	2	-	-	
J. Wolfe, Nenagh.	Tipperary.	Loam.	-	-	-	3 8	22 4	10	-	-	
P. W. Kenny, Waterford.	Waterford.	Clay loam.	-	-	-	6 6	45 8	11 7	11 78	11 9	
Thos. Webster, Gorey.	Wexford.	Gravelly clay.	8 17	16 9	13 5	16 22	6 18	9 11	19 10	10 10	
L. Murphy, Roundwood.	Wicklow.	Sandy.	-	-	-	-	-	-	-	-	
P. J. Byrne, Ashford.	"	Medium loam.	-	-	-	-	-	-	-	-	
Average yield per statute acre.			6 18	23 8	1 5	17 20	6 17	7 10	25 8	15 15	
"	"	in 1903.	5 14	15 6	9 7	11 19	8 10	7 16	21 8	17 17	
"	"	in 1902.	7 5	28 8	13 6	6 30	7 16	7 10	21 8	11 11	
"	"	in 1901.	8 1	32 9	13 8	12 27	9 19	9 4	23 10	7 7	

Other varieties were included in the experiment at a few centres, but as the number of centres was so small the details relating to these varieties have not been inserted in the general table. The names of these, together with the number of centres at which each was grown, and the average yield per statute acre are given in the following table:--

Name of Variety.	Number of Centres at which grown.	Average yield per Statute Acre.		
		Saleable.	Small.	Total.
		Tons. Cwt.	Cwt.	Tons. Cwt.
Dr. Matthew.	9	9 1	18	9 19
Empress Queen.	7	10 6	26	11 12
Scottish Triumph.	6	10 0	28	11 8
Northern Star.	6	10 18	20	11 18
British Queen.	4	10 2	47	12 9

## VARIETY TEST.

## STATUTE ACRE FROM EACH CENTRE.

Old Champion.			Beauty of Butc.			Up-to-Date.			Evergood.			Charles Fidler.			Hibernia.		
Saleable.	Small.	Total.	Saleable.	Small.	Total.	Saleable.	Small.	Total.	Saleable.	Small.	Total.	Saleable.	Small.	Total.	Saleable.	Small.	Total.
tms. cwt.	cwt.	tms. cwt.	tms. cwt.	cwt.	tms. cwt.	tms. cwt.	cwt.	tms. cwt.	tms. cwt.	cwt.	tms. cwt.	tms. cwt.	cwt.	tms. cwt.	tms. cwt.	cwt.	tms. cwt.
9 16 39	11 15	13 0	45 15 5	13 16	35 15 11	13 19	23 15 2	13 0	27 14 7	10 12	17 11 9	10 0	13 10	13 0	27 14 7	10 12	17 11 9
10 0 13	10 13	10 1	33 11 14	8 18	13 9 16	9 19	16 10 15	8 7	5 8 12	6 18	14 7 12	8 18	12 9 10	9 10	40 11 0	11 0	11 0
8 18 12	9 10	9 10	40 11 10	11 15	40 13 15	6 15	20 7 15	8 5	30 9 15	13 10	35 15 5	7 10	50 10 0	6 0	13 6 13	6 13	10 7 3
7 10 50	10 0			10 2	40 12 2	6 0	40 8 0	9 0	40 11 0			6 0	10 4 10	2 19	10 3 9	3 10	4 3 14
6 0 10	6 10	6 0	13 6 13	6 13	10 7 3	6 0	15 6 15	4 0	30 5 10	8 0	22 9 2	4 0	10 4 10	2 19	10 3 9	3 10	4 3 14
4 0 10	4 10	2 19	10 3 9	3 10	4 3 14	3 0	9 3 9	1 0	2 1 2	5 1	9 5 10	9 10	43 11 13	10 15	72 14 7	10 15	48 13 3
9 10 43	11 13	10 15	72 14 7	10 15	48 13 3	9 18	34 11 12	12 3	31 13 14	9 5	42 11 12	3 12	50 6 2	5 0	27 6 7	4 7	17 5 4
3 12 50	6 2	5 0	27 6 7	4 7	17 5 4	5 0	26 6 6	-	-	-	-	4 0	30 5 10	8 0	22 9 2	9 5 10	
9 15 20	10 15				11 0	14 11 14	6 12	10 7 2	-	-	-	-	9 15 67	13 2			-
9 15 67	13 2				12 0	41 14 1	5 1	25 6 6	-	-	-	-	7 13 21	8 14			-
7 13 21	8 14				11 1	31 12 12	10 6	25 11 11	-	-	-	-	7 10 56	10 6			-
7 10 56	10 6																
6 8 24	7 12	5 10	21 6 11	8 0	20 9 0	3 19	22 5 1	5 8	9 5 17	-	-	-	4 11 44	6 15	5 8	42 7 10	6 19
4 11 44	6 15	5 8	42 7 10	6 19	25 8 4	5 14	32 7 6	2 8	12 3 0	5 9	33 7 2	2 8	4 2 24	5 16	5 0	32 6 12	5 17
4 2 24	5 16	5 0	32 6 12	5 17	25 7 2	4 11	19 5 10	2 13	17 3 10	5 12	39 7 11	2 13	7 8 34	9 2	7 8	46 9 14	9 5
7 8 34	9 2	7 8	46 9 14	9 5	44 11 9	-	-	-	-	-	21 10 6	-					
3 10 26	4 16	4 1	25 5 6	4 3	18 5 1	6 7	23 7 10	-	-	-	6 16	27 8 3	6 15 90	11 5	6 6	81 10 7	7 0
6 15 90	11 5	6 6	81 10 7	7 0	43 9 3	7 17	57 10 14	-	-	-	7 5 57	10 2	6 17 28	8 5	9 6	24 10 10	9 15
6 17 28	8 5	9 6	24 10 10	9 15	24 10 19	7 0	26 8 6	2 14	7 3 1	7 14	33 9 7		4 14 4	4 18	7 10	28 8 18	6 12
4 14 4	4 18	7 10	28 8 18	6 12	4 6 16	-	-	-	-	-	-	-	10 16 9	11 5	10 7	9 10 16	11 6
10 16 9	11 5	10 7	9 10 16	11 6	13 11 19	11 15	28 13 3	-	-	-	-	-					
7 2 32	8 14	7 7	34 9 1	8 12	26 9 18	7 10	25 8 15	6 5	19 7 4	7 13	28 9 1		7 10 30	9 0	9 4	31 10 15	10 10
7 10 30	9 0	9 4	31 10 15	10 10	19 11 9	9 6	32 10 18	9 14	19 10 13	7 14	42 9 16		6 8 45	8 13	8 17	32 10 9	8 14
6 8 45	8 13	8 17	32 10 9	8 14	24 9 18								10 15 43	12 18	10 2	31 11 13	13 15
10 15 43	12 18	10 2	31 11 13	13 15	23 14 18												

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## III.—MANGOLDS.

This experiment was designed with the object of discovering some simple and profitable method of manuring the mangold crop, and was carried out on twenty-one farms in the counties of Antrim, Carlow, Cork, Kildare, Kilkenny, Sligo, Tipperary, Waterford, Wexford and Wicklow. The complete results of the experiment are shown in the Table on page 496.

For convenience of reference the average results are reproduced in the following table:—

Plot	Manures applied per statute acre.	Average yield per acre.	Increase due to Manures.	Value of Increase.			Cost of Manures.			Estimated Profit per acre.		
		tons cwt.	tons cwt.	£	s.	d.	£	s.	d.	£	s.	d.
1	No Manure. . . . .	8 8	—	—	—	—	—	—	—	—	—	—
2	15 tons Farmyard Manure.	22 3	13 15	6	17	6	3	0	0	3	17	6
3	15 tons Farmyard Manure. 4 cwt. Superphosphate. .	25 3	16 15	8	7	6	3	13	0	4	14	6
4	15 tons Farmyard Manure. 4 cwt. Superphosphate. . 2 cwt. Sulphate of Am- monia.	27 7	18 19	9	9	6	4	18	0	4	11	6
5	15 tons Farmyard Manure. 4 cwt. Superphosphate. . 2 cwt. Sulphate of Am- monia. 2 cwt. Kainit. . . . .	29 17	21 9	10	14	6	5	3	0	5	11	6
6	15 tons Farmyard Manure. 4 cwt. Superphosphate. . 2 cwt. Sulphate of Am- monia. 4 cwt. Sulf. . . . .	31 18	23 10	11	15	0	5	2	0	6	13	0

Mangolds require liberal treatment, and the results of this experiment prove that the farmer who applies dressings of suitable manures freely and largely is amply repaid.

On Plot 2 an application of 15 tons dung was given, and on each of Plots 3, 4, 5 and 6 a different mixture of artificial manures was added to this quantity of dung.

The effects of the different mixtures were as follows:—The addition of 4 cwt. superphosphate increased the crop to such an extent as to leave a profit of 17s. per acre from its use; the further addition of 2 cwt. sulphate of ammonia did not increase the crop sufficiently to pay for the extra cost of the manure; while the still further addition of 2 cwt. kainit made up for this deficiency and left a profit of 17s. per acre more than was obtained on Plot 3. Hence it will be seen that, although the application of a good dressing of farmyard manure left a considerable profit, the addition of a complete mixture of artificial manures has increased that profit by 34s. per acre after paying for the cost of the manures.

On Plot 6, 4 cwt. salt was substituted for the 2 cwt. kainit applied on Plot 5, and at almost every centre the salt gave the heavier crop.

On the average, the salt produced 2 tons per acre more than the kainit, and as the cost was practically the same in both cases, a profit of 21s. 6d. per acre is shown in favour of the salt. As the same result has been obtained in each of the past four years it would appear that as a rule mangolds respond better to a dressing in which salt is included than to one in which kainit is included.

The following tables gives the average yields obtained in the experiments conducted in 1901, 1902, 1903, and 1904:—

Plot.	Manures applied per acre.	Average yield in 1901.	Average yield in 1902.	Average yield in 1903.	Average yield in 1904.
		tons cwt.	tons cwt.	tons cwt.	tons cwt.
1	No Manure, . . . . .	15 9	7 1	3 3	8 8
2	15 tons Farmyard Manure, . . . . .	26 12	18 0	16 5	22 3
3	15 tons Farmyard Manure, . . . . .	27 13	19 7	17 13	25 3
	4 cwt. Superphosphate, . . . . .				
4	15 tons Farmyard Manure, . . . . .	31 0	22 11	23 12	27 7
	4 cwt. Superphosphate, . . . . .				
	2 cwt. Sulphate of Ammonia, . . . . .				
5	15 tons Farmyard Manure, . . . . .	33 12	24 18	24 6	29 17
	4 cwt. Superphosphate, . . . . .				
	2 cwt. Sulphate of Ammonia, . . . . .				
	2 cwt. Kainit, . . . . .				
6	15 tons Farmyard Manure, . . . . .	36 11	25 12	25 10	31 18
	4 cwt. Superphosphate, . . . . .				
	2 cwt. Sulphate of Ammonia, . . . . .				
	4 cwt. Salt, . . . . .				

## MANGOLD EXPERIMENT:—

TABLE SHOWING THE RETURNS PER

Name and Address of Farmer.	County.	Character of Soil.	Variety of Mangold.	Plot 1. No Manure.	
					tons cwt.
W. Ledlie, Mullaghglass.	Antrim.	Light.	Yellow Globe.	7	12
M. Tuite, Kiloloney.	Carlow.	Peaty loam.	Yellow Globe.	15	9
P. Dowling, Ballybrit.	"	Clay.	Yellow Globe.	7	17
J. P. Barry, Rosscarbery.	Cork.	Medium loam.	Yellow Globe.	14	14
Timothy Gould, Crookstown.	"	Medium loam.	Yellow Globe.	9	0
S. W. Yates, Athy.	Kildare.	Light loam.	Long Red.	5	0
W. R. Ronaldson, Leixlip.	"	Heavy loam.	Orange Globe.	4	0
J. Moore, Thomastown.	Kilkenny.	Clay.	Long Red.	9	16
E. Coogan, Castlecomer.	"	Medium loam.	Long Red.	2	11
J. Dalton, Piltown.	"	Strong clay.	Yellow Globe.	15	0
O. Wynne, Hazlewood.	Sligo.	Peaty loam.	Yellow Globe.	12	9
J. T. Max, Thurles.	Tipperary.	Loam.	Yellow Globe.	5	16
M. O'Rourke, Thurles.	"	Loam.	Yellow Globe.	9	5
J. Wolfe, Nenagh.	"	Loam.	Yellow Globe.	12	10
G. O'Leary, Nenagh.	"	Light loam.	Yellow Globe.	7	3
E. Murphy, Ballyneil.	Waterford.	Loam.	Yellow Globe.	0	17
T. Webster, Gorey.	Wexford.	Gravelly clay.	Yellow Globe.	3	0
M. Doyle, Tagout.	"	Clay loam.	Yellow Globe.	18	11
J. Brennan, Ovoca.	Wicklow.	Clay loam.	Long Red.	3	6
Mrs. Burke, Baltinglass.	"	Light loam.	Long Red.	4	3
P. J. Byrne, Ashford.	"	Medium loam.	Long Red.	8	18
Average yield per statute acre.				8	8
Increase due to Manures.				—	
Value of the Increase : Mangolds estimated at 10s. per ton.				—	
Cost of Manures.				—	
Estimated profit per statute acre.				—	

## MANURIAL TEST.

## STATUTE ACRE FROM EACH CENTRE.

Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.
15 tons Farmyard Manure.	15 tons Farmyard Manure. 4 cwt. Superphosphate.	15 tons Farmyard Manure. 4 cwt. Superphosphate. 2 cwt. Sulphate of Ammonia.	15 tons Farmyard Manure. 4 cwt. Superphosphate. 2 cwt. Sulphate of Ammonia. 2 cwt. Kainit.	15 tons Farmyard Manure. 4 cwt. Superphosphate. 2 cwt. Sulphate of Ammonia. 4 cwt. Salt.
tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
18 10	21 0	22 0	23 16	24 18
18 14	24 1	21 11	29 10	29 11
15 8	15 19	16 17	21 3	23 5
23 2	35 11	37 13	36 10	39 0
32 0	31 10	34 17	32 10	40 5
15 0	18 0	19 0	21 10	23 0
27 10	32 10	31 0	37 10	38 5
19 5	22 19	24 14	25 14	29 17
19 16	23 5	30 5	31 16	33 17
32 18	36 4	38 8	38 10	39 5
22 12	22 9	28 3	30 5	31 11
19 2	21 5	25 5	27 0	30 17
16 1	17 2	21 8	23 12	30 0
27 3	28 10	33 1	40 0	41 2
11 12	10 15	14 6	18 6	17 8
23 8	25 17	26 1	29 17	30 1
27 16	28 9	29 9	30 19	34 9
20 15	24 2	28 17	29 3	28 15
20 14	23 10	25 8	27 5	28 4
21 4	30 14	31 2	34 8	38 13
33 0	34 11	35 12	37 14	37 14
<hr/>				
22 3	25 3	27 7	29 17	31 18
13 15	16 15	18 19	21 9	23 10
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
6 17 6	8 7 6	9 9 6	10 14 6	11 15 0
3 0 0	3 13 0	4 18 0	5 3 0	5 2 0
3 17 6	4 14 6	4 11 6	5 11 6	6 13 0

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## IV.—OATS.

## A.—MANURIAL TEST.

The experiment on the manuring of oats in 1904, which was similar to those of the three previous years, was carried out at seventeen centres in Counties Antrim, Armagh, Cork, Down, Kildare, Derry, Sligo, and Tipperary.

The object of these experiments has been to test the effects of artificial manures when used singly and in combination, and the complete results are given in Table I.

For the sake of easier reference the average figures are reproduced in the following table:—

Plot.	Manures applied per Statute Acre.	Average Yield per Statute Acre		Increase due to Manures.		Value of Increase.	Cost of Manures.	Estimated Profit per Statute Acre.
		Grain.	Straw.	Grain.	Straw.			
		Cwt. Qr.	Cwt.	Cwt. Qr.	Cwt.	£ s. d.	£ s. d.	£ s. d.
1	No manure. . . . .	15 1	23	—	—	—	—	—
2	1 cwt. Sulphate of Ammonia. . . . .	18 3	34	3 2	6	1 7 8	0 12 6	0 15 2
3	3 cwt. Superphosphate. . . . .	18 0	30	2 3	2	0 17 8	0 9 9	0 7 11
4	3 cwt. Kainit. . . . .	17 2	29	2 1	1	0 13 6	0 7 6	0 6 0
5	1 cwt. Sulphate of Ammonia, 3 cwt. Superphosphate. . . . .	21 1	37	6 0	9	2 5 6	1 2 3	1 3 3
6	1 cwt. Sulphate of Ammonia, 3 cwt. Superphosphate, 3 cwt. Kainit. . . . .	22 3	41	7 2	13	2 19 6	1 9 9	1 9 9

The effect of the application of the different manures was more marked last year than in any of the other years during which the experiment was carried out, in so far as each application has resulted in a profitable increase in the crop. The mixtures applied on plots 5 and 6 have invariably given profitable returns, but in the case of plots 2, 3 and 4, on which sulphate of ammonia, superphosphate and kainit. respectively, were applied, the returns have been irregular: sometimes profitable, sometimes not. Even during the past season, at a few individual centres these manures, when applied singly, failed to produce any increase in the crop.

The mixture of sulphate of ammonia and superphosphate applied on plot 5 increased the crop to such an extent as to leave a profit of 23s. per acre from its use, while the same mixture, with the addition of kainit, as applied on plot 6, resulted in a profit of 30s. per acre. As was mentioned above, these two mixtures have given satisfactory returns in each of the four years during which the experiment has been tried in this country, but the profit has always been greater from plot 6 than from plot 5.

While, therefore, farmers cannot always rely on getting a profitable increase in crop from the use of sulphate of ammonia, superphosphate or kainit when applied alone, yet they may be fairly confident of realising a substantial profit when all three are used together in the same proportions as they were applied on plot 6.

The figures referring to the past four years' experiments are given side by side in the following table:—

Plot.	Manure applied per Statute Acre.	Average Yield in 1904.		Average Yield in 1903.		Average Yield in 1902.		Average Yield in 1901.	
		Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
		Cwt. Qr.	Cwt.	Cwt. Qr.	Cwt.	Cwt. Qr.	Cwt.	Cwt. Qr.	Cwt.
1	No manure, . . . .	15 1	28	14 0	26	17 0	30	13 1	22
2	1 cwt. Sulphate of Ammonia, . . . .	18 3	34	15 2	29	19 3	34	16 1	27
3	3 cwt. Superphosphate, .	18 0	30	16 2	27	18 0	33	16 0	27
4	3 cwt. Kainit, . . . .	17 2	29	15 0	26	18 0	30	14 0	24
5	1 cwt. Sulphate of Ammonia, 3 cwt. Superphosphate, . . . .	21 1	37	19 0	33	21 1	36	19 0	33
6	1 cwt. Sulphate of Ammonia, 3 cwt. Superphosphate, 3 cwt. Kainit, .	22 3	41	21 0	38	23 0	40	20 1	35

\* 2 cwt. Kainit in 1901.

#### B. VARIETY TEST.

This experiment, designed to test the cropping powers of certain recently introduced varieties of oats as compared with those of old-established varieties, such as "Potato" and "Black Tartarian," was carried out at fifteen centres in Counties Armagh, Cork, Down, Kildare, Kilkenny, Sligo, Waterford and Wexford. The figures referring to each centre, together with the average yield of grain and straw produced by each variety, are given in Table II. In this table are also given the average yields of each variety obtained in similar experiments during the three previous years.

Last year the heaviest yield both of grain and of straw was obtained from "Banner," the next best variety being "Waverley." In each year of the experiment these varieties have been consistently the best croppers. As this result has been obtained in different seasons and under widely varying conditions of soil, situation, climate and cultivation, strong testimony of their value is thus afforded, and farmers may be safely recommended to grow either or both of them. It should be borne in mind, however, that the newer varieties frequently give disappointing results on land which is naturally poor or on land in low condition. Under such circumstances the seed should be sown more thickly than usual, or artificial manures should be applied in accordance with the recommendations given above and on the opposite page.



## OAT EXPERIMENT—

TABLE I.—Showing the Returns per

Name and Address of Farmer.	County.	Variety of Oat.	Character of Soil.	Plot 1.	
				No Manure.	
				Grain.	Straw.
				Cwt. Qr.	Cwt.
A. Lawther, Dunadry, .	Antrim, .	Poland, . .	Poor, gravelly, .	9 1	22
D. Patterson, Dervock, .	" .	" . .	Medium Loam, .	16 0	26
R. and J. Moore, Coleraine, .	" .	Potato, . .	" . .	12 1	24
Dr. Allen, Ardrae, .	Armagh, .	Tartar King, .	Loam, . .	7 2	22
W. G. Gray, Markethill, .	" .	Tam Finlay, .	Clay, . .	16 2	31
W. Costigan, Killylea, .	" .	Waverley, .	Limestone Loam, .	26 0	24
R. R. Murphy, Keady, .	" .	Lightfoot, .	Heavy Clay, .	18 1	35
John Dineen, Clonakilty, .	Cork, .	Black Tartary, .	Medium Loam, .	16 3	28
P. Shields, Downpatrick, .	Down, .	—	Loam, . .	16 1	28
H. Lowry, Comber, .	" .	" . .	" . .	14 0	28
John Quinn, Robertstown, .	Kildare, .	Black Tartary, .	Heavy Loam, .	8 1	16
A. Hamilton, Ballymagroarty, .	Londonderry, .	Potato, . .	Medium Loam, .	17 0	22
W. Jamison, Eglinton, .	" .	Prolific, . .	" . .	11 2	20
W. Thorpe, Coleraine, .	" .	Islandmagee, .	Clay Loam, .	19 3	32
Sir J. Gore-Booth, Lissadell, .	Sligo, .	Potato, . .	Sandy Loam, .	17 3	60
Major O'Hara, Collooney, .	" .	" . .	Heavy Loam, .	15 0	22
G. O'Leary, Nenagh, .	Tipperary, .	Waverley, .	Light Loam, .	19 1	28
Average yield per Statute Acre. . . . .				15 1	28
Increase due to Manures, . . . . .				—	—
Value of Increase : Grain at 8 <i>d.</i> per stone and Straw at 1 <i>s.</i> 6 <i>d.</i> per Cwt., . . . . .				—	—
Cost of Manures, . . . . .				—	—
Estimated Profit per Statute Acre, . . . . .				—	—

## MANURIAL TEST.

Statute Acre from each Centre.

Plot 2. 1 Cwt. Sulphate of Ammonia.		Plot 3. 3 Cwt. Super- phosphate.		Plot 4. 3 Cwt. Kainit.		Plot 5. 1 Cwt. Sulphate of Ammonia. 3 Cwt. Super- phosphate.		Plot 6. 1 Cwt. Sulphate of Ammonia. 3 Cwt. Super- phosphate. 3 Cwt. Kainit.	
Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
Cwt. Qr.	Cwt.	Cwt. Qr.	Cwt.	Cwt. Qr.	Cwt.	Cwt. Qr.	Cwt.	Cwt. Qr.	Cwt.
11 2	32	15 1	35	8 3	24	18 1	42	26 1	56
20 1	38	23 1	33	21 1	32	25 3	38	28 2	45
15 0	30	18 3	25	15 2	25	20 1	30	22 1	40
10 2	23	16 2	27	16 0	24	20 2	30	21 2	40
25 2	35	19 2	26	20 2	30	23 0	35	22 2	34
25 1	27	24 1	25	22 1	25	28 3	33	23 3	30
19 1	40	17 2	30	18 3	33	22 1	38	25 2	45
25 0	45	21 3	40	21 0	37	25 0	49	26 2	56
21 0	34	20 1	31	20 0	30	25 0	40	27 0	50
18 1	39	17 1	30	16 0	31	17 0	35	16 1	38
9 0	20	11 3	18	11 1	16	12 2	20	16 0	25
21 3	29	16 2	22	15 1	22	21 0	28	24 0	34
18 0	33	16 0	30	18 0	34	23 3	45	20 3	38
21 2	56	18 0	29	17 2	30	23 2	38	26 1	39
18 0	57	18 3	60	20 0	60	20 0	65	20 1	60
19 1	30	15 1	20	16 0	19	16 1	26	18 1	26
18 1	30	17 2	26	19 1	29	20 0	29	22 3	34
18 3	34	18 0	30	17 2	29	21 1	37	22 3	41
3 2	6	2 3	2	2 1	1	6 0	9	7 2	13
£ s. d. 1 7 8		£ s. d. 0 17 8		£ s. d. 0 13 6		£ s. d. 2 5 6		£ s. d. 2 19 6	
0 12 6		0 9 9		0 7 6		1 2 3		1 9 9	
0 15 2		0 7 11		0 6 0		1 3 3		1 9 9	

## OAT EXPERIMENT.-

TABLE II.—Showing the Returns per

Name and Address of Farmer.	County.	Character of Soil.	Potato.		Black Tartarian.		Goldfinder.	
			Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
			ewt. qr.	ewt.	ewt. qr.	ewt.	ewt. qr.	ewt.
P. Rice, Mullabawn,	Armagh.	Light.	12 2	25	17 1	27	10 2	12
R. R. Murphy, Keady,	"	Heavy.	9 2	17	12 0	20	7 0	20
W. J. McGinnis, Breagh.	"	Medium.	11 1	20	14 1	22	10 3	20
D. Coghlan, Buttevant.	Cork.	Limestone Loam.	20 0	29	21 0	25	-	-
John Dineen, Clonakilty.	"	Medium Loam.	25 1	47	32 0	49	29 0	38
Wm. Roberts, Ballinacraig.	"	Strong Loam.	20 1	-	18 1	-	22 3	-
Lord Dunleath, Ballywalter.	Down.	Clay Loam.	22 1	52	24 2	49	21 1	36
J. M. Tweedie, Rathfriland.	"	"	13 2	27	15 0	24	15 1	25
D. Dunne, Kilcock.	Kildare.	Loam.	15 2	35	18 3	38	18 2	20
D. Dunne, Rathangan.	"	"	23 3	38	18 0	32	15 3	22
James Dalton, Piltown.	Kilkenny.	Strong Clay.	18 3	43	16 3	42	20 0	39
Sir J. Gore-Booth, Lissadell.	Sligo.	Medium Loam.	25 1	40	30 0	50	30 1	50
J. B. A. Bosinquet, Portlaw.	Waterford.	Loam.	30 2	57	26 1	42	32 2	53
P. W. Kenny, Waterford.	"	Clay.	-	-	21 1	42	21 3	59
M. Doyle, Taggart.	Wexford.	Clay Loam.	19 0	38	17 1	29	17 1	23
Average yield per statute acre,			19 0	36	20 1	35	18 3	32
"	"	in 1903.	18 1	41	19 3	40	22 2	39
"	"	in 1902.	20 1	36	21 0	34	22 0	34
"	"	in 1901.	17 0	29	17 0	26	21 2	31

# VARIETY TEST.

Statute Acre from each Centre.

Abundance.		Waverley.		Tartar King.		Pioneer.		Storm King.		Banner.		Local Variety.		Name of Local Variety.
Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	
wt. qr.	wt.	wt. qr.	wt.	wt. qr.	wt.	wt. qr.	wt.	wt. qr.	wt.	wt. qr.	wt.	wt. qr.	wt.	
15 0	25	16 1	25	8 3	20	10 0	22	15 0	25	-	-	-	-	-
16 1	18	18 2	21	17 2	20	16 1	20	17 0	21	-	-	18 0	35	Lightfoot.
16 3	17	20 0	20	16 1	20	16 0	21	14 1	25	-	-	-	-	-
19 0	21	19 3	21	23 3	24	20 0	23	18 1	19	-	-	23 1	27	Excelsior.
33 1	61	28 1	49	27 1	55	24 2	30	32 2	60	-	-	-	-	-
21 3	-	16 2	-	22 3	-	22 2	-	19 3	-	14 3	-	-	-	-
25 1	43	26 0	38	20 0	35	21 1	41	16 2	36	27 2	47	21 1	61	Lightfoot
16 0	23	18 3	25	17 0	26	15 2	25	13 2	22	17 1	20	12 0	33	"
25 0	40	16 2	35	-	-	-	-	12 2	25	-	-	-	-	-
21 0	35	25 0	40	-	-	-	-	18 0	24	-	-	-	-	-
18 3	23	22 0	23	17 2	24	18 2	23	16 0	29	19 3	36	-	-	-
25 1	49	31 1	50	15 0	35	-	-	23 1	40	31 3	50	22 1	60	Hamilton
26 3	40	32 2	47	33 3	45	33 3	63	34 2	50	33 3	42	-	-	-
20 0	35	26 2	61	-	-	28 1	41	20 0	42	21 1	45	-	-	-
17 3	28	19 0	32	12 3	19	15 2	23	11 2	21	-	-	-	-	-
21 1	33	22 2	35	19 1	29	20 1	31	18 3	31	23 3	40	-	-	
19 1	33	22 2	36	18 1	33	20 0	31	18 3	31	22 2	39	-	-	
20 2	30	23 2	34	18 3	29	19 3	31	19 0	29	23 0	32	-	-	
21 1	27	22 0	29	19 0	27	19 2	26	-	-	-	-	-	-	

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## V. TURNIPS.

## A.—MANURIAL.

Two separate experiments on the manuring of the turnip crop were carried out in 1904, similar to those of 1901, 1902, and 1903. The objects of the experiments were :—

- (1.) To test the effects of artificial manures used alone.
- (2.) To test the effects of artificial manures in combination with farmyard manure.

The experiment designed to test the effects of artificial manures used alone was carried out on eighteen farms in Counties Carlow, Cork, Down, Kildare, Sligo, Tipperary, Wexford, and Wicklow. The detailed results will be found on Table I., pp. 506–507.

The fact that phosphatic manures are all-important to the successful growth of turnips is so well known among farmers that it is unnecessary to call attention to the results obtained on plot 2, to which superphosphate was applied at the rate of 4 cwt. per statute acre, the crop produced being such as to leave an estimated profit from the use of the manures of £5 14s. per acre.

From a comparison of the figures referring to plots 2, 3, and 4, an opinion can be formed as to the advisability of adding nitrogenous and phosphatic manures to the superphosphate. On plot 3 the addition of 1 cwt. sulphate of ammonia increased the crop just sufficiently to pay for the extra cost of the manure, and no advantage can therefore be claimed from its use; but the further addition of 3 cwt. kainit on plot 4 enabled the farmer to obtain an increased profit of 16s. 6d. per acre over that obtained from the use either of superphosphate alone or of superphosphate and sulphate of ammonia together. The inference to be drawn from these figures is that more satisfactory returns, both as to yield of crop and as to profit, are likely to be got from the use of a *complete* mixture of manures than from the use of an *incomplete* mixture. There is so little to choose between the returns from the two complete mixtures used on plots 4 and 5 that the extra labour involved in handling the more complex mixture applied on plot 5 is scarcely justified.

The second experiment, designed to test the effects of the addition of artificial manures to farmyard manure, was carried out on thirty-three farms in Counties Antrim, Armagh, Carlow, Cavan, Cork, Down, Kildare, Kilkenney, Londonderry, Wexford, and Wicklow. The results of this experiment are shown on Table II., pp. 508–509.

The application of 20 tons of dung (see plot 2) may be regarded as a standard dressing, and one which is very generally relied on, and it was the object of the experiment to determine whether equally heavy crops could be obtained, on farms where the supply of dung is necessarily limited, by supplementing a lighter dressing of farmyard manure with suitable artificial manures. A comparison of the yields obtained on plots 2 and 4 shows that where 4 cwt. superphosphate was used along with 10 tons of dung, a slightly heavier crop was obtained than where the dung was applied alone at the rate of 20 tons per acre. In the experiments of 1903 and 1902 a similar result was obtained, while in 1901 the balance was in favour of the heavier dressing of dung to the extent of half a ton of turnips per acre. There seems little

doubt, therefore, that where farmyard manure is scarce, farmers may rely on obtaining a perfectly satisfactory crop of turnips by using a lighter dressing of dung and supplementing it with an application of about 4 cwt. superphosphate per acre. The experiment was further intended to show whether other forms of artificial manure (nitrogenous and potassic) could be profitably applied along with the superphosphate (see plots 5 and 6). The returns from individual centres are so contradictory on this point that conclusions drawn from the average figures are apt to prove misleading.

Where land is in fairly good condition, it is very doubtful whether the use of manures containing nitrogen and potassium can be recommended, but on land which is naturally poor, or is in low condition, it is probable that such manures will pay for their application.

The following tables show the average results obtained in similar experiments in 1901, 1902, 1903, and 1904 :—

(1.) *Artificial Manures used alone.*

Manure.	Yield per acre in 1901.	Yield per acre in 1902.	Yield per acre in 1903.	Yield per acre in 1904.
	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.
No Manure, . . . . .	4 10	5 11	2 2	4 9
4 cwt. Superphosphate, . . . .	19 8	17 12	14 7	20 7
4 cwt. Superphosphate, 1 cwt. Sulphate of Ammonia, . . . . .	22 9	18 10	15 1	21 18
4 cwt. Superphosphate, 1 cwt. Sulphate of Ammonia, 3 cwt. Kainit, . . . .	23 14	23 5	18 6	24 13
2 cwt. Superphosphate, 2 cwt. Dissolved Bones, 1 cwt. Bone Flour, 3 cwt. Sul- phate of Ammonia, 2 cwt. Kainit, . . . .	24 8	23 13	19 9	25 3

(2.) *Artificial Manures used in combination with Farmyard Manure.*

Manure.	Yield per acre in 1901.	Yield per acre in 1902.	Yield per acre in 1903.	Yield per acre in 1904.
	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.
No Manure, . . . . .	5 8	5 14	2 4	5 15
20 tons Farmyard Manure, . . . .	23 19	22 16	19 3	26 6
10 tons Farmyard Manure, . . . .	19 4	17 14	14 5	22 4
10 tons Farmyard Manure, 4 cwt. Super- phosphate, . . . . .	23 10	23 9	20 9	27 0
10 tons Farmyard Manure, 4 cwt. Super- phosphate, 1 cwt. Sulphate of Ammo- nia, . . . . .	24 5	25 12	21 19	28 16
10 tons Farmyard Manure, 4 cwt. Super- phosphate, 1 cwt. Sulphate of Ammo- nia, 3 cwt. Kainit, . . . . .	24 13	27 6	23 13	29 7

## B.—VARIETY

The object of this experiment was to test the cropping capabilities of  
The experiment was conducted on eighteen farms in Counties Antrim,  
first nine varieties on the list are swedes and the rest are yellow turnips.  
obtained with all varieties tested in the past four seasons, will be found

## TURNIP EXPERIMENT.—MANURIAL

TABLE I.—Showing the Returns

Name and Address of Farmer.	County.	Character of Soil.	Variety of Turnip.
Mrs. Murphy, Kildavin, . . .	Carlow, . . .	Medium Loam, . . .	Best-of-All, . . .
J. Nolan, Tullow, . . .	" . . .	Sandy, . . .	Abundance, . . .
Timothy Gould, Crookstown, . . .	Cork, . . .	Medium Loam, . . .	Purple Top, . . .
R. Lyttle, Donasloney, . . .	Down, . . .	Clay Loam, . . .	" . . .
James Kidd, Loughbrickland, . . .	" . . .	Loam, . . .	" . . .
John Campbell, Donaghadee, . . .	" . . .	Moory Loam, . . .	Abundance, . . .
Alex. Macdonald, Newtownards, . . .	" . . .	Gravel Loam, . . .	" . . .
P. Gray, Athy, . . .	Kildare, . . .	Loam, . . .	Purple Top, . . .
E. Shiel, Killeague, . . .	" . . .	Clay, . . .	" . . .
Major O'Hara, Collooney, . . .	Sligo, . . .	Heavy Loam, . . .	" . . .
G. O'Leary, Nenagh, . . .	Tipperary . . .	Loam, . . .	" . . .
J. Wolfe, Nenagh, . . .	" . . .	" . . .	Magnum Bonum, . . .
M. Redmond, New Ross, . . .	Wexford, . . .	Gravelly Clay, . . .	Purple Top, . . .
M. Doyle, Tagcoat, . . .	" . . .	Clay Loam, . . .	" . . .
W. Kelly, Baltinglass, . . .	Wicklow, . . .	Light Loam, . . .	" . . .
L. Murphy, Roundwood, . . .	" . . .	Sandy, . . .	" . . .
J. Brennan, Ovoca, . . .	" . . .	Light Loam, . . .	" . . .
P. J. Byrne, Ashford, . . .	" . . .	Medium Loam, . . .	" . . .
Average Yield per Statute Acre, . . . . .			
Increase due to Manures, . . . . .			
Value of Increase: Turnips at 8s. per ton, . . . . .			
Cost of Manures, . . . . .			
Estimated Profit per Statute Acre, . . . . .			

**TEST.**

different varieties of swedes and yellow turnips.

Carlow, Down, Kildare, Kilkenny, Sligo, Wexford, and Wicklow. The figures referring to each centre, together with the average results on Table III., pp. 510-511.

**TEST (WITHOUT FARMYARD MANURE).**

per Statute Acre from each Centre.

Plot 1. No Manure.	Plot 2. 4 Cwt. Superphosphate.	Plot 3. 4 Cwt. Superphosphate 1 Cwt. Sulphate of Ammonia.	Plot 4. 4 Cwt. Superphosphate, 1 Cwt. Sulphate of Ammonia, 3 Cwt. Kainit.	Plot 5. 2 Cwt. Superphosphate, 2 Cwt. Pure Dissolved Bones, 1 Cwt. Bone Flour, 4 Cwt. Sulphate of Ammonia, 2 Cwt. Kainit.
Tons Cwt. 3 0	Tons Cwt. 27 10	Tons Cwt. 24 11	Tons Cwt. 27 16	Tons Cwt. 31 13
5 13	21 7	21 10	27 10	28 18
4 0	20 7	23 3	23 13	22 7
0 0	17 0	22 0	24 5	25 5
0 0	21 8	20 15	25 3	25 6
13 0	31 0	28 0	28 15	29 5
13 10	20 0	21 4	21 4	22 5
15 6	22 0	24 6	27 9	26 15
4 10	22 3	24 0	25 3	22 3
2 0	10 0	20 0	23 13	22 11
0 0	21 0	22 4	23 9	26 0
8 8	19 3	20 16	24 1	25 0
0 0	13 7	14 6	16 9	16 10
6 11	29 15	29 10	30 14	30 16
0 0	21 4	26 15	32 6	32 16
0 0	9 19	10 9	13 1	15 3
1 11	23 11	24 1	23 5	29 17
4 17	15 15	16 16	20 13	21 4
4 9	20 7	21 18	24 18	25 3
—	15 18	17 9	20 9	20 14
—	£ s. d. 6 7 0	£ s. d. 6 19 6	£ s. d. 8 3 6	£ s. d. 8 5 6
—	0 13 0	1 5 6	1 13 0	1 14 0
—	5 14 0	5 14 0	6 10 6	6 11 6



## TURNIP EXPERIMENT.—MANURIAL

TABLE II.—Showing the Returns

Name and Address of Farmer.	County.	Character of Soil.	Variety of Turnip.
William Keers, Ballymoney, . . .	Antrim, . . .	Clay Loam, . . .	Best-of-All, . . .
J. Young, Randalstown, . . .	" . . .	Peat Loam, . . .	Crimson King, . . .
A. Lawther, Dunadry, . . .	" . . .	Medium Loam, . . .	Champion, . . .
D. Patterson, Dervock, . . .	" . . .	Light Loam, . . .	Magnum Bonum, . . .
W. J. Wilson, Killylea, . . .	Armagh, . . .	Medium, . . .	Purple Top, . . .
W. J. McIntyre, Mullahead, . . .	" . . .	Heavy Loam, . . .	Abundance, . . .
Bates Bros., Ardarae, . . .	" . . .	Loam, . . .	Magnum Bonum, . . .
R. Lyons, Drumgane, . . .	" . . .	" . . .	Purple Top, . . .
J. J. Kerr, Killedmond, . . .	Carlow, . . .	" . . .	Champion, . . .
J. Neill, Ballon, . . .	" . . .	" . . .	Abundance, . . .
J. Foley, Leighlin Bridge, . . .	" . . .	Gravel Loam, . . .	Best-of-All, . . .
L. Fitzsimmons, Virginia, . . .	Cavan, . . .	Loam, . . .	Purple Top, . . .
John Smith, Carrickvilla, . . .	" . . .	Poor Clay, . . .	" . . .
John Madden, Buttevant, . . .	Cork, . . .	Heavy Loam, . . .	Elephant, . . .
John O'Regan, Kilavullen, . . .	" . . .	Medium Loam, . . .	Magnum Bonum, . . .
Richard Ronayne, Middleton, . . .	" . . .	Limestone Loam, . . .	Garton's Model, . . .
Timothy Gould, Crookstown, . . .	" . . .	Medium Loam, . . .	Purple Top, . . .
Richard Lyttle, Donaconey, . . .	Down, . . .	Clay Loam, . . .	" . . .
James Kidd, Loughbrickland, . . .	" . . .	Loam, . . .	" . . .
John Campbell, Donaghadee, . . .	" . . .	Peat Loam, . . .	Abundance, . . .
Alexander Macdonald, Newtownards, . . .	" . . .	Gravel Loam, . . .	" . . .
H. Hosie, Coursetown, . . .	Kildare, . . .	Strong Loam, . . .	Purple Top, . . .
P. Daly, Steevensstown, . . .	" . . .	" . . .	" . . .
E. Cogan, Castlecomer, . . .	Kilkenny, . . .	Medium Loam, . . .	" . . .
J. Dalton, Piltown, . . .	" . . .	Strong Clay, . . .	Knockdown, . . .
T. Brennan, Kilkenny, . . .	" . . .	Clay Loam, . . .	Advance, . . .
J. Stewart, New Buildings, . . .	Derry, . . .	Medium Loam, . . .	Abundance, . . .
J. McFarland, Dungiven, . . .	" . . .	Gravel Loam, . . .	Purple Top, . . .
M. Redmond, New Ross, . . .	Wexford, . . .	Gravelly Clay, . . .	" . . .
M. Doyle, Taggart, . . .	" . . .	Clay Loam, . . .	" . . .
W. Kelly, Bultinglass, . . .	Wicklow, . . .	Light Loam, . . .	" . . .
J. Brennan, Ovoca, . . .	" . . .	Clay Loam, . . .	" . . .
L. Murphy, Roundwood, . . .	" . . .	Sandy, . . .	" . . .
Average yield per Statute Acre, . . . . .			
Increase due to Manures, . . . . .			
Value of Increase : Turnips at 8s. per ton, . . . . .			
Cost of Manures, . . . . .			
Estimated Profit per Statute Acre, . . . . .			

## TEST (WITH FARMYARD MANURE).

per Statute Acre from each Centre.

Plot 1.  No Manure.	Plot 2.  20 Tons Farmyard Manure.	Plot 3.  10 Tons Farmyard Manure.	Plot 4.  10 Tons Farmyard Manure, 4 Cwt. Super- phosphate.	Plot 5.  10 Tons Farm- yard Manure, 4 Cwt. Super- phosphate. 1 Cwt. Sul- phate of Ammonia.	Plot 6.  10 Tons Farm- yard Manure, 4 Cwt. Super- phosphate, 1 Cwt. Sulphate of Ammonia, 3 Cwt. Kainit.
Tons Cwt.	Tons Cwt.	Tons Cwt.	Tons Cwt.	Tons Cwt.	Tons Cwt.
0 10	30 4	24 10	28 11	29 14	30 6
0 0	33 17	33 14	34 17	36 18	32 4
0 0	28 6	25 7	27 13	30 16	27 8
0 10	26 3	17 1	28 18	29 0	29 1
0 18	30 0	20 1	25 10	25 19	25 0
0 0	31 17	22 18	28 0	28 2	26 0
9 0	25 14	22 12	23 6	30 4	28 11
11 16	24 18	22 0	24 3	27 16	24 10
0 0	26 11	21 0	27 8	30 6	31 2
18 0	29 11	26 18	31 18	29 8	31 6
16 10	22 13	21 2	25 0	27 3	29 4
0 0	16 0	8 0	32 0	34 0	37 10
0 0	22 0	15 8	22 0	28 0	30 0
1 19	32 2	21 14	31 15	31 15	31 18
19 5	30 10	29 11	35 16	36 3	40 16
2 13	28 7	24 15	24 8	27 7	30 1
4 0	23 0	18 10	24 18	23 6	20 5
0 0	20 5	14 10	22 0	25 6	29 0
0 0	26 0	22 9	29 4	31 2	30 16
12 0	32 0	31 0	32 15	32 10	33 10
12 10	29 0	24 14	27 5	27 12	28 8
20 0	30 0	28 0	29 0	28 0	30 0
15 5	30 0	26 5	30 10	30 10	33 0
5 6	22 11	27 2	25 8	27 4	27 4
10 6	35 13	37 6	35 17	39 9	34 15
3 0	19 7	17 10	16 18	19 13	24 8
1 10	26 0	19 0	20 10	22 15	25 0
16 0	24 10	23 15	26 5	27 10	27 10
0 0	9 16	5 4	15 12	15 1	18 6
6 11	18 19	14 15	21 4	29 7	26 18
0 0	33 16	30 16	33 16	34 6	35 17
1 11	37 3	27 15	34 0	37 3	39 16
0 0	11 0	7 17	14 2	17 16	18 17
5 15	26 6	22 4	27 0	28 16	29 7
—	20 11	16 9	21 5	23 1	23 12
—	£ s. d. 8 4 6	£ s. d. 6 11 6	£ s. d. 8 10 0	£ s. d. 9 4 6	£ s. d. 9 9 0
—	4 0 0	2 0 0	2 13 0	3 5 6	3 13 0
—	4 4 6	4 11 6	5 17 0	5 19 0	5 16 0

## TURNIP EXPERIMENT.—

TABLE III.—Showing the Returns per

Name and Address of Farmer.	County.	Character of Soil.	Stirling Castle. (1)	Im- proved Purple Top. (2)	Ele- phant. (3)	Kan- garoo. (4)	Best of All. (5)
			T. C.	T. C.	T. C.	T. C.	T. C.
W. H. Donaghy, Ballymoney.	Antrim.	Medium Loam.	29 9	26 5	29 1	30 14	32 4
W. Barklie, Ballynure.	"	"	26 13	22 12	21 17	24 0	25 0
J. Mahon, Adnahue.	Carlow.	Clay.	22 12	24 17	23 16	22 1	24 13
T. Tennant, Bagnalstown.	"	Medium Loam.	29 8	28 7	31 10	26 3	23 14
R. Shannon, Loughbrickland.	Down.	Loam.	27 19	27 7	25 12	26 12	32 13
W. Savage, Downpatrick.	"	"	23 16	23 4	26 9	27 1	32 18
Col. Sharman-Crawford, Crawfordsburn.	"	Clay Loam.	29 10	32 2	30 18	30 16	29 13
F. B. Small, Poyntzpass.	"	Loam.	29 11	29 2	28 10	27 7	29 10
P. Behan, Donadea.	Kildare.	"	31 15	28 12	32 16	31 18	33 9
H. Hosie, Athy.	"	Strong Loam.	29 7	29 15	31 15	29 10	34 3
P. Brennan, Freshford.	Kilkenny.	Limestone Loam.	19 2	22 1	18 9	16 14	18 17
L. Corr, Cuffesgrange.	"	Strong Loam.	26 9	22 13	26 16	18 3	20 0
Major O'Hara, Collooney.	Sligo.	Loam.	29 11	28 2	22 3	20 0	30 0
M. Redmond, New Ross.	Wexford.	—	19 2	19 5	20 9	16 13	17 13
M. Doyle, Tagoeat.	"	Clay Loam.	30 4	32 11	32 2	30 2	30 11
M. Keenan, Roundwood.	Wicklow.	Sandy.	21 4	23 11	23 11	25 18	26 17
P. J. Byrne, Ashford.	"	Clay Loam.	15 15	17 19	9 15	16 16	11 8
J. Brennan, Ovoca.	"	"	29 4	21 4	30 3	30 12	32 10
Average Yield per Statute Acre.			26 8	25 16	25 17	25 1	27 5
Average Yield per Statute Acre in 1903.			25 11	25 19	24 4	24 18	26 5
Average Yield per Statute Acre in 1902.			19 15	20 11	19 16	22 6	23 11
Average Yield per Statute Acre in 1901.			22 16	22 6	22 5	25 6	27 9

# VARIETY TEST.

Statute Acre from each Centre.

Magnum Bonum.	Triumph.	Queen Swede.	Defiance.	Aberdeen Green Top.	Centenary.	Fosterton Hybrid.	Purple Top.	Achilles.
(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
T. C.	T. C.	T. C.	T. C.	T. C.	T. C.	T. C.	T. C.	T. C.
32 7	31 12	32 9	—	26 10	41 11	—	36 0	—
27 13	22 0	20 9	23 5	22 17	32 7	31 12	28 4	28 9
24 0	25 10	23 1	25 4	31 10	38 7	27 17	26 14	27 15
26 2	30 15	25 16	30 6	33 15	40 0	32 7	29 16	33 0
32 3	27 0	—	23 3	35 3	—	—	—	34 10
31 3	29 7	—	28 16	31 15	—	34 13	35 4	32 8
32 5	29 7	—	26 16	36 15	—	29 1	31 6	32 11
29 14	29 0	—	28 10	31 13	—	31 12	34 7	28 0
31 10	35 16	30 18	34 2	—	—	—	—	—
33 13	32 5	29 16	26 4	25 0	34 5	29 14	—	28 0
12 11	14 7	16 9	16 2	—	—	—	—	—
24 6	20 16	21 3	18 19	—	—	—	—	—
22 6	—	22 10	—	30 9	39 4	40 10	34 0	—
17 11	19 6	11 1	16 19	29 1	33 16	29 19	26 9	25 4
31 17	31 5	25 13	32 7	34 11	38 16	30 18	31 2	26 11
23 2	23 11	—	30 12	25 18	38 3	28 5	31 2	28 5
21 4	19 0	18 9	16 16	—	31 10	23 5	20 13	17 19
32 10	37 14	22 3	26 8	—	—	—	—	—
27 11	26 19	23 14	25 6	30 7	36 16	30 18	30 8	28 11
25 14	25 18	23 1	25 0	28 8	36 16	29 17	28 2	31 0
23 6	24 8	20 0	19 16	20 3	27 4	24 5	20 8	23 14
27 12	24 7	—	25 6	24 10	—	24 17	22 1	22 17

*Copies of this article in leaflet form (No. 41) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.*

## CALF MEALS.

Samples of calf meals or milk substitutes, which are largely imported into Ireland, have lately been examined by the Department. Some brands of these meals have been sold at from 21s. to 28s. per cwt., that is at prices which are quite out of proportion to their real value at the market rates for feeding stuffs. No calf meal, however well prepared, can be worth the above prices.

Examination and analysis of such preparations disclose the fact that their true feeding value is in many cases not so high as that of good linseed cake. This will readily be seen from the following figures:—

	Sample of Linseed Cake manufactured in Ireland. Sold at 8s. 6d. per cwt.	A Milk Substitute. Sold at 28s. per cwt.
	Per cent.	Per cent.
Water, . . . . .	97	112
<b>OIL,</b> . . . . .	<b>10.3</b>	<b>10.0</b>
<b>ALBUMINOIDS,</b> . . . . .	<b>28.4</b>	<b>15.4</b>
<b>CARBOHYDRATES,</b> . . . . .	<b>36.9</b>	<b>67.7</b>
Fibre, . . . . .	9.6	2.3
Ash, . . . . .	5.1	3.4
	100.0	100.0

From these analyses it will be noticed that, compared with the linseed cake, the milk substance is slightly inferior in oil and substantially inferior in albuminoids. The milk substitute contains more carbohydrates, but it should be remembered that of the three main nutritive constituents in food, viz.:—oil, albuminoids and carbohydrates, the last is of least value. If the values of the linseed cake and milk substitute be estimated according to a system often used for the valuation of foodstuffs in accordance with analysis, the linseed cake is shown to be worth 8s. 6d. (*i.e.*, about its average price), and the milk substitute slightly over 7s. per cwt.

It has come to the knowledge of the Department that vendors of, or agents for, certain calf meals have stated that the use of their preparations is recommended by the Department. The Depart-

ment have made no such recommendation. Farmers are cautioned not to be influenced by such statements, and are asked to report to the Department cases where vendors attribute to their goods the Department's commendation.

An excellent calf food which, when used with a small allowance of pure linseed cake, has so far given the best results in the Department's calf-rearing trials may be prepared by mixing two parts by weight of oatmeal, two parts of maize meal, and one part of pure ground flax seed. All these meals should be finely ground. This food should not cost more than 10s. 6d. per cwt., that is less than half the price charged for some calf meals. It should be prepared for use by boiling with water, or by scalding, with boiling water and allowing to stand for twelve hours. Beginning with  $\frac{1}{4}$  lb. per head per day for calves a month old—calves should receive new milk during the first month—the allowance may soon be increased to  $\frac{1}{2}$  lb. and more per day as the calves become older. This allowance may be profitably supplemented by  $\frac{1}{2}$  lb. to 1 lb. of pure linseed cake per head per day.

The Department have examined many samples of linseed cake meal and the so-called "linseed meal" and have found the majority grossly adulterated with rape, hemp, rice meals, or weed seeds. Farmers should, therefore, insist on having pure linseed cake, which may be prepared for calves by steeping the finely nutted cake in hot water for eight or ten hours. It can then be fed to the calves in the separated milk.

Under the Fertilisers and Feeding Stuffs Act, 1893, the vendor of a feeding stuff which has been artificially prepared is required to furnish the buyer with an invoice stating the name of the article, and whether it has been prepared from one substance or seed, or from more than one substance or seed, and this invoice has the effect of a warranty. Any statement made by the vendor in an invoice of a feeding stuff, or in any circular or advertisement descriptive of the feeding stuff as to the percentage of nutritive and other ingredients contained in the article, shall also have effect as a warranty. A breach of this warranty is committed by the vendor of a feeding stuff in any of the following cases:—(a) where the analysis of a sample drawn as prescribed in the Regulations made under the Act shows a calf meal to contain a less proportion of nutritive ingredients than is stated in the invoice circular or advertisement descriptive of the meal; (b) where a calf meal contains any substance deleterious to the health of calves; and (c)

where a feeding stuff sold as linseed meal or linseed cake meal contains rice, hemp, or rape meal, or an undue proportion of weed seeds. Farmers should report to the Department any purchase in which the vendor fails to supply an invoice.

The Department strongly urge farmers to avail themselves of the protection which the above-mentioned Act affords to purchasers of feeding stuffs. The provisions of this Act are dealt with in the Department's leaflet No. 15, copies of which may be obtained free of charge and post free on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.

*Copies of this Article in leaflet form (No. 54) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.*

## THE WORKING OF THE FERTILISERS AND FEEDING STUFFS ACT, (1893), IN GREAT BRITAIN.

The Departmental Committee appointed by the Board of Agriculture and Fisheries to inquire into the working of the Fertilisers and Feeding Stuffs Act of 1893\* has made its report.† The Committee was empowered by the terms of reference of the minute appointing it not only to enquire into the working of the Act, but also to report on the various methods in which it has been administered, and the results which have attended its operation. The Committee was also instructed to consider whether any, and, if so, what, further measures could be taken for the better protection of vendors and purchasers of the articles.

The objects of the inquiry naturally grouped themselves under three main heads, viz., failure, if any, in the administration of the Act; deficiencies, if any, in the safeguards to the purchaser; and deficiencies, if any, in the safeguards to the seller. Evidence was accordingly taken from officers connected with the execution of the Act, from farmers and others interested in the purchase of fertilisers and feeding stuffs, and from manufacturers and sellers.

The first class of witnesses was represented by a Superintending Inspector of the Board of Agriculture, by a representative of the County Councils' Association, by the Clerk to the County Councils of Glamorganshire, and by six District Agricultural Analysts. The District Agricultural Analysts, from their intimate acquaintance with the farming community, were also able to speak from the agriculturists' point of view (one of them indeed being a representative of the Central and Associated Chambers of Agriculture), and to a certain extent, though in much less degree, from the point of view of the manufacturer. In addition to the analysts, the agriculturists were represented by nine witnesses—the large majority of whom were practical farmers—including representatives of the Royal Agricultural Society of England, the Highland and Agricultural Society of Scotland, the Central and Associated Chambers of Agriculture, the Scottish

\* See Department's Leaflet No. 15 (Revised).

† Cd. 2372—1905.



Chamber of Agriculture, and three farmers' associations of a more local character. From the point of view of the seller, the witnesses included four manufacturers of fertilisers, two of fertilisers and feeding stuffs, three of feeding stuffs, three importers (two of whom are included among the manufacturers), and two distributors. In addition to the examination of witnesses the Committee received representations from various persons interested in the subject of the inquiry.

The Committee has drafted an analysis of the evidence under the following heads :—(1) Present Administration ;  
**Analysis of the** (2) Causes of Inefficiency ; (3) Deficiency in  
**Evidence.** Safeguards to the Purchaser ; (4) Deficiency in  
 Safeguards to the Seller ; (5) Miscellaneous.

A Digest of this analysis follows.

1. Inquiries conducted by the Inspectors of the Board of Agriculture throughout Great Britain show that County  
**Administration of** Councils may, generally speaking, be classified  
**the Act.** into two groups, viz. : (i.) those which follow  
 the procedure apparently contemplated by the  
 Act, and offer facilities for having samples taken for analysis ; and  
 (ii.) those which have gone further, and taken the initiative in sampling.  
 The former is by far the larger group.

In the first class, the principal facility offered is the payment by almost all Local Authorities of a varying—but in some cases large—proportion of the District Analyst's fees, so that the farmer pays very little ; in a few instances farmers can have their samples analysed free. In spite of low fees, however, farmers are reluctant to take steps to have their samples analysed.

It would appear also that there is some correlation between the number of samples analysed, and the steps taken by Local Authorities to spread among farmers a knowledge of the facilities afforded by the Act to ascertain the nature of the fertilisers and feeding stuffs they have purchased. Some counties have distinguished themselves in this way by issuing circulars, and through their lecturers on agriculture, &c., as well as by reducing the fees. In this connection it is pointed out that County Council lecturers in agriculture and horticulture can render great service in making the advantages of the Act known.

The small number of samples taken is insufficient to act as a deterrent to fraud in any great degree ; and the Board of Agriculture have accordingly pressed upon Local Authorities the desirability of their taking further steps to bring home to farmers the necessity of seeing

to the quality of their purchases. The principal suggestion offered by the Board of Agriculture has been that the County Councils should have appointed as Analyst's representatives, for the purpose of taking samples, officers of the Local Authority. These officers, however, instead of waiting until they are called upon to take samples by the buyer (Sec. 5 of the Act), are empowered to act upon their own initiative, and to endeavour to persuade farmers to let them take samples; they are also instructed to obtain information as to the character of the trade in fertilisers and feeding stuffs in the district.

Where samples are taken in this manner, the costs have naturally to be borne by the Local Authority. This raises the question as to how far County Councils are empowered, under the Act, to spend money on this object. Local Authorities have in some cases, felt themselves unable to adopt the procedure suggested by the Board, owing to their considering themselves unauthorised to spend public money in this manner; but, in other cases, the County Councils do not appear to have considered that there was any objection to such an outlay.

Other points raised in connection with the administration by local authorities are that (1) the varying methods of County Councils are very disturbing, particularly in the case of persons or associations on the border of two counties; (2) there should also be a uniform charge for analysis in each county; (3) County Councils display as much apathy as buyers, and urban members oppose any reduction of the fee; (4) the Board of Agriculture should intervene when County Councils do not take effective action.

Prosecutions under the Act appear to be rare; in many cases County Councils are unwilling to undertake them. In only a few counties can it be said that the prosecutions have been sufficiently numerous to act as a deterrent to fraud. The purchaser prefers to come to an arrangement with the seller.

Some suggestions were made with a view to facilitating the institution of proceedings by Local Authorities. For

**Some suggestions  
for an  
Amending Act.**

instance, some difficulty has been experienced in satisfying the Court with regard to Section 7 of the Act; and it is suggested that it would be an improvement if powers were given to a County Council to act through an officer. Power should also be given to the Board of Agriculture to institute proceedings, as under some other Acts.

In many cases, when a retailer has been convicted of an offence under the Act, and has been fined, the wholesale dealer refunds the

amount of the fine to the retailer. The distributors are often grocers who are able to show they have sold the article in the same condition as they bought it. Indeed, the Act, in Section 3 (3), provides for this ; but County Councils appear to find difficulty in subsequently instituting proceedings against the wholesale dealer. In this respect it ought, therefore, to be assimilated to the Sale of Food and Drugs Acts, as this would enable fraud to be brought home to the original wrongdoer. It would also be of great assistance to County Councils in tracing an offence back to the original offender if power were given, as in Section 20 (5) of the Sale of Food and Drugs Act, 1875, to prosecute the original vendor in the same Court as the retailer. One witness suggests that the prosecution should be instituted against the original manufacturers and not against the retailer.

In the general opinion of the witnesses examined the Act might be made more deterrent than it actually is. It fails, however, to detect much of the fraud that does occur. In its favour it is said that it has done much good ; that it has had some deterrent effect upon fraud, although this effect is thought to be wearing off ; and that it has done good by making invoices compulsory, and by making clear the meaning of such terms as linseed cake, &c. Manufacturers are unanimous in considering that the Act has proved a deterrent to fraud, that they were stimulated to improve their products, and that the average quality of both fertilisers and feeding stuffs is very much better than it was prior to 1893. The Chemical Committee of the Royal Agricultural Society, on the other hand, do not attach much value to the Act, and consider that the purchaser had sufficient safeguards before its introduction. Some witnesses regard it as an absolute failure or a dead letter ; they hold that it has not been a deterrent to fraud, that it does not afford sufficient protection to the purchaser, and also that the penal clauses detract greatly from its utility.

The main weakness of the Act appears to lie in the difficulty of putting it into operation so as to safeguard the smallest and least instructed class of farmers. All the evidence goes to show that the large farmers are sufficiently protected, or can protect themselves ; partly because they buy from large merchants or from the manufacturers direct, and partly because they are better able to judge of the value of the stuff they purchase. Moreover, such analyses as are made, either under the Act, or otherwise, are almost always on behalf of large farmers or of associations. It is essentially the small farmer,

who, through apathy, want of information, or on account of his relations with the seller, is liable to suffer from having adulterated or inferior produce sold to him by the smaller class of retailers. More fraud occurs in making up small orders to definite instructions than in the bulk made up by manufacturers for the season. Large farmers can also purchase their goods at a much cheaper rate than small farmers; and the cases of exorbitant charges apply more particularly with reference to the latter. For small farmers, moreover, the simplification of the Regulations is even more necessary than for large, as they are less able to grasp the procedure.

Indeed, there is a wide demand for "simplification" of these Regulations, but very few definite suggestions have been made as to what Regulations should be substituted for those in force, although it is generally admitted that Regulations should be made by the Board under the Act. Many of the witnesses content themselves with the expression of a desire to see them simplified without offering any suggestions. It is stated, too, that farmers do not understand the Regulations.

The question of delay is also a matter for consideration. Farmers frequently, if not usually, do not order their manures and feeding stuffs until they are actually ready to use them; and to delay for some days would often mean losing a favourable opportunity of putting the fertilisers on the land or keeping their live stock on short rations. Many farmers cart their manure direct from the railway station to the field, where it would be impossible to take samples in accordance with the Regulations.

Some farmers do not care to incur the cost, small as it is in many counties, of having their purchases analysed. This, of course, applies more strongly in the case of small consignments. In some instances purchasers consider that a certificate merely informing them that "the sample agrees with the invoice" is not worth the 2s. 6d. or 5s. they have paid for it, and some witnesses accordingly desire that the analyst should state the actual constituents in his certificate.

Section 1 of the Act provides that the seller of a manufactured or imported fertiliser shall give to the purchaser an invoice stating the name of the article, whether it is artificially compounded, and what is at least the percentage of nitrogen, soluble and insoluble phosphates, and potash. Some merchants send to their customers invoices without any guarantee of the constituents, and in some cases invoices

**Deficiencies in Safe-  
guards to Purchasers  
and suggested  
Amendments.**

are not given at all. Illegal invoices are given more often by merchants than by manufacturers; and it is stated that they are on the increase. The Act provides a sufficient remedy; and it is suggested that the Board of Agriculture should warn merchants that if they continue to give illegal invoices they will be prosecuted.

Section 1 provides that the invoice shall state what is *at least* the percentage of the valuable constituents. This has led many merchants, fearing that their goods may prove on analysis to contain less than the amount stated, to guarantee merely a nominal amount.

In order to prevent merchants from giving nominal guarantees it is proposed that the constituents should be guaranteed within certain limits, *i.e.*, that the actual amount present should be guaranteed, and that the merchant should be liable to prosecution, if, upon analysis, the constituent proved to be outside these particular limits, which should be chosen just sufficiently wide to cover unavoidable and accidental variations in composition.

A very large number of witnesses suggest that Inspectors should be appointed by the Local Authorities to take samples, generally compulsorily. These witnesses desire, in fact, that the procedure of taking samples under the Fertilisers and Feeding Stuffs Act should be assimilated to that under the Sale of Food and Drugs Acts. The view is also expressed that, inasmuch as farmers are liable to have the produce supplied by them sampled in transit under the latter Acts, so the goods supplied to them should be equally liable to be sampled at the public expense.

Certain objections in the practical working of this suggestion are enumerated. In the first place, the substances which are analysed under the Sale of Food and Drugs Acts are products containing more or less definite quantities of certain constituents, or for which standards have been imposed by legislation, so that it is easy to determine whether they have been adulterated or impoverished. Artificial fertilisers and feeding stuffs, on the other hand, may be made up so as to contain particular ingredients in any proportions, so that neither the Analyst nor the Local Authority, unless they had the invoice, could know whether the constituents of the article were as represented or not.

To meet this point, it is suggested that the bags in which fertilisers and feeding stuffs are consigned should have the constituents of their contents branded or stamped upon them. This would involve any given bag being used for only one particular kind of manure of the same constitution. This is apparently, however, already done in a few special cases. Farmers, again, often[send their own bags. Cakes

are not usually sent in bags ; and it is estimated that to bag cakes would add 5s. per ton to their cost. Manufacturers generally regard the proposal to brand or label bags as impracticable.

In the event of samples being taken in transit—*i.e.*, chiefly at railway stations—delay might be caused in the delivery of the consignments, and the railway companies could accordingly charge for demurrage. Such sampling might also cause delay in delivery of the goods to the consignee.

Some witnesses suggested that samples should not be taken compulsorily, but only at the instance of the purchaser. Either the Inspector might wait for the purchaser to request him to take samples, or he might on his own initiative ask the purchaser to allow him to take samples.

The suggestion that Inspectors should purchase samples for the purpose of analysis, as is done under the Sale of Food and Drugs Acts, is impracticable under the existing Act in the case of fertilisers, since the Act does not apply in the case of purchase of less than half a hundred weight (§ 1(3) ) ; but it is practicable, in the case of feeding stuffs, for which no limit of size is prescribed.

It has been strongly urged by many witnesses that the Act will not be efficient unless Inspectors can take samples without reference to buyer or seller, and it is desirable that this should be done, if the practical difficulties can be overcome. Other witnesses think that samples should be taken only under instructions from the Local Authority ; and that there should be no compulsion if it can be avoided.

As regards the class of persons who should act as such official samplers, some witnesses suggest that the Inspectors under the Sale of Food and Drugs Acts would be a suitable body of men, while others proposed the officers of analytical societies, wherever available. Manufacturers, however, urge strongly that any officials appointed to take samples should be specially trained for that purpose ; sampling requires experience, and should be most carefully done. They object particularly to the police being employed for this purpose.

Some witnesses suggest that the Board of Agriculture, or County Councils, should publish the particulars, giving the names of the merchants, in all cases where a consignment proves upon analysis to be inferior to the guarantee. This was, and is now, frequently done by the associations in Scotland, and by the Highland and Agricultural Society, which give particulars of all the analyses made on behalf of their members, publishing the names in the reports circulated among

the members. No protests are reported to have been raised against such action, nor do legal proceedings appear to have been threatened on account of such publication.

It is suggested that the Board should publish unit schedules, in order to enable purchasers to judge of the value of a manure when they know its constitution. The price of a unit of a valuable constituent (*i.e.* nitrogen, phosphates, and potash) in any manure is usually taken to be the value of each 1 per cent. of the constituent in a ton of the manure. This procedure is largely followed in Scotland, where the Highland and Agricultural Society annually issues a schedule, showing the value of each unit of the fertilising constituents in various kinds of manures. Thus, in the schedule issued by that Society for the season 1903, the price of a unit of soluble phosphates in superphosphate is placed at 1s. 10d. per unit. By this is meant that the value of a ton of superphosphate containing 28 per cent. of soluble phosphate is worth 28 times 1s. 10d., or £2 11s. 4d. per ton. These unit values are drawn up in consultation with manufacturers so as to yield them a fair profit, and thus represent commercial prices. They are applicable to seaport towns; for inland places the cost of carriage has of course to be added. In the case of large consignments, a reduction can usually be obtained from manufacturers. When farmers in Scotland find that the charges are too high they have no difficulty in coming to an arrangement with the seller upon the terms of these units; in fact, these schedules are in considerable demand among the manufacturers themselves. It is admitted, however, that for the Board of Agriculture to issue such a list of values would be equivalent to the State fixing the price of these commodities, and it was then suggested that County Councils might undertake this work for their districts. Some witnesses object to this proposal.

Section 2 of the Act provides that the invoice shall state whether any feeding stuff has been prepared from one or from more than one substance or seed; and that, failing any specific statement as to admixture, the feeding stuff is to be considered as pure, *i.e.*, that it is prepared only from the substance or substances specified in the invoice, or that is a product only of the seed or seeds named. The Act thus does not require that the constituents shall be stated, as in the case with fertilisers; although § 2 (4) provides that, if a seller makes any statement in an invoice, advertisement, or trade circular, as to its constituents, such statement shall have effect as a warranty. There is a large demand that the nutrient constituents of feeding stuffs, *i.e.*, the oil, carbo-hydrates, and albuminoids—should be guaranteed just as

much as the constituents of fertilisers. Cakes may differ very materially in composition, and therefore in quality ; so that there is nothing in the Act to prevent a farmer from getting cakes of poor quality when he is paying the value of a much richer article.

Certain exceptions would have to be made to a general requirement to give a guarantee of the constituents of feeding stuffs : meals from cereals, or linseed, etc., should be exempted. Such substances should be guaranteed merely as pure, and of average composition. Some witnesses, however, would place meals on the same footing as other feeding stuffs.

But on the question of guaranteeing these constituents certain difficulties arise. Manufacturers say that it is impossible to state, with any approach to accuracy in the majority of cases, what amount of these constituents any particular feeding stuff contains, at least without analysing cakes, etc., after manufacture, when it would be too late to stamp them. The objection felt by manufacturers to the proposed ten per cent. limits is particularly strong in the case of feeding stuffs. Some object to the adoption of any limits at all, if any infringement of them is to render the seller liable to criminal proceedings. Manufacturers would be willing that the limits should be considerably narrower, if they are to be liable to civil proceedings only, than they could guarantee if a prosecution might be the result. Many manufacturers of feeding stuffs consider that purity only, and not percentages, should be guaranteed. Purity is generally admitted to be the first consideration ; and it is also suggested that prosecutions should be instituted only in respect of impurity, variations in the analytical constitution being a matter for adjustment between buyer and seller.

Manufacturers are unanimous in desiring that a distinction should be drawn between cases of fraud or culpable negligence and of accidental deficiency in any constituent. They are glad to see fraud repressed, and consider that the criminal clauses should be retained in the Act. But they desire that prosecution should be possible only in cases where there is very strong probability that there has been fraud or culpable carelessness. They point out that the mere fact of their appearance in a criminal court, even if acquitted, results in great injury to their business ; and the resultant publicity in the event of a conviction is very damaging to their credit. They lay great stress on their liability to be prosecuted for deficiencies that are merely accidental and beyond their control, and urge that deficiencies of a class

#### **Deficiencies in Safe- guards to Seller.**



that are unavoidable in all businesses are treated under the Act as criminal offences. They are perfectly prepared to settle any differences of this character by mutual arrangement with their customers in the same manner as is done in other trades. Moreover, the Act itself clearly contemplates the possibility of buyer and seller coming to an agreement; nevertheless, although this may have been done to the satisfaction of the purchaser, the seller is still liable to have proceedings instituted against him by a County Council in respect of the same alleged offence. It is mainly with the object of avoiding these "frivolous" prosecutions (as many witnesses term them), that manufacturers are unanimous in desiring that no prosecution should be instituted except with the approval of the Board of Agriculture. Manufacturers of basic slag maintain that special regulations are necessary in the case of this product. Unlike many manufactured fertilisers, it is purely a by-product; producers aim only at securing uniformity in the steel products, and cannot devote much attention to uniformity in the refuse basic slag. Some witnesses think that samples should be taken at the factory, port of entry, or in transit, as well as the farm. Many sellers, while agreeing to the suggestion that samples should be taken at the factory, object to samples being taken at all after the goods have left their hands; on the ground that they have no longer any control over the goods, which may deteriorate from many causes while on their journey.

Complaint is made that under the existing regulations for taking samples, which involve the breaking up of the cakes and mixing of the materials, etc., insufficient guarantee is afforded as to the identity of the package from which the sample is taken. This applies more particularly to cakes, which are generally branded with the name or mark of the manufacturers; and the latter maintain that they may be charged with selling impure or deficient goods which did not in reality emanate from their premises. This consideration applies especially in the case of goods sold by a middleman under well-known names, and becomes important in view of the suggestion that the original seller should be joined with the defendant in any prosecution. The question of the identity of the sample is also a strong factor in the manufacturer's insistence on their right to receive notice of sampling.

Although the Act provides that a retailer who has been convicted under the Act shall have the same remedies, civil and criminal, against the wholesale dealer from whom he bought, as his customer had against him, yet the same objections to appearance in a criminal court are felt by the retailers as by the manufacturers. It is therefore suggested

that the wholesale merchant should be joined with the retailer in any prosecution ; or that the procedure should be assimilated to that under the Sale of Food and Drugs Act ; *i.e.*, that where the retailer can show that he bought the goods from the wholesale merchant in the same condition, and with the same invoice, as he sold to his customer, he should be discharged and proceedings instituted against the wholesale dealer.

Manufacturers also desire that the value of any excess above the amount guaranteed in one constituent should be set against any deficiency in another. This should, of course, hold only within reasonable limits. It is recognised that if a purchaser specifically demands a certain quantity of any constituent, he should be entitled to have it, and that a seller cannot be said to have satisfied the customer if he delivers a material of quite different constitution but equal value.

In the case of manures mixed to the order of the seller, chemical reactions, whose extent it is not always possible to foresee, may be set up between some of the materials. Sellers, when asked to mix manures, usually inform their customers if the ingredients will react upon each other. A seller should therefore not be required to give a guarantee of the composition of the resultant mixture, if this has been made at the purchaser's request ; but it should be sufficient to state the composition of the individual items.

Manufacturers desire that a copy of the analysis, when a sample is taken under the Act should be forwarded by the analyst to the seller as well as to the purchaser. The manufacturer should have the right to utilise the services of the official analyst.

Chemists should come to some agreement as to uniform methods of analysis ; the Board of Agriculture should take steps to standardise the methods.

#### **Miscellaneous Criticisms and Suggestions.**

When a sample is found upon analysis to be below the guarantee, some analysts make a practice of informing purchasers of the amount of deduction to which they are "entitled" from the price charged. This is not required by the Act ; but it is of great use to the farmers where it is done. There appears to be a general demand on the part of farmers for more information concerning their purchases than the Act empowers analysts to give, and many would welcome advice from the latter.

The more important conclusions arrived at by the Departmental Committee may be summarised as follows :—

That power should be given to Local Authorities to use public funds for the purposes of the Act.

**Conclusions and Recommendations.** That Local Authorities should appoint persons, with the approval of the Board of Agriculture, to act as Official Samplers.

That these persons be authorised to take samples for analysis whenever requested to do so by purchasers on their behalf; and also, under the direction of the Local Authority, to take test samples, not necessarily in accordance with the Regulations, with a view to the location of fraud. The whole of the expense of sampling and analysis should, in cases where test samples have been taken, be borne by the Local Authority. The sampling officers should be authorised to take samples compulsorily upon the premises of the purchaser, in transit, or on the premises of the seller.

That the purchaser, when sending a sample to the Analyst, should not be obliged to forward the invoice, or a copy of it, and that the copy, if sent, may omit the names and other matter identifying the seller. But in the event of his electing not to send the invoice or copy, the Analyst should be empowered to charge an enhanced fee, the additional amount being payable by the purchaser.

That the formation and maintenance of associations of farmers combining for the purpose of having their manures and feeding stuffs analysed should be encouraged; and that County Councils should be empowered to contribute to the expenses of such associations.

That the oil and albuminoids be guaranteed in manufactured feeding stuffs, except in the case of foods consisting of a particular seed, either whole or ground, but not otherwise altered.

That the seller be required to state the actual constituents present in fertilisers and feeding stuffs.

That when an article is found to differ in any respect from the guarantee given by the seller, a distinction should be drawn between cases where such deficiency is due to causes beyond the seller's control, and where it is apparently due to fraudulent intent or culpable negligence.

That the Board of Agriculture issue a statement of the limits, above or below the guarantee, within which the constituents of each of the principal fertilisers and feeding stuffs may reasonably be expected to vary from causes beyond the seller's control, and which the Analyst

should use to assist him in his decision whether to endorse his certificate or not, having regard also to any other circumstances before him regarding the honesty or negligence of buyer or seller.

That no prosecution be instituted except with the approval of the Board of Agriculture.

That either a fraudulent intent or, at least, culpable carelessness as to the truth of the invoice, should be a condition of liability under Sec. 1 (3) (b).

That Section 1 (3) of the Act of 1893, which exempts sales of less than half a hundred weight from the provisions of Section 1, be omitted.

That any statement by the seller in any circular or advertisement descriptive of a fertiliser shall have effect as a warranty.

That the scope of the Act be extended to cover food for poultry.

That in any determination of the value of basic slag, regard be had to the proportion of phosphoric acid which is soluble in a 2 per cent. solution of citric acid.

That provisions similar to those of Section 25 of the Sale of Food and Drugs Act, 1875, and Section 20 (3) of the Sale of Food and Drugs Act, 1899, be enacted for the protection of sellers other than the makers of the goods.

That the Board of Agriculture and Fisheries take steps to secure uniformity of procedure in the analysis of fertilisers and feeding stuffs.

## OFFICIAL DOCUMENTS.

## I.—AGRICULTURE.

IMPROVEMENT IN THE MANAGEMENT OF  
CREAMERIES.\*

## I.—REGULATIONS, 1905-6.

	Page
1. <i>Registration of Creameries and Auxiliaries,</i>	528
2. <i>Winter Courses of Dairy Technology,</i>	530
3. <i>Creamery Managers' Certificates,</i>	530
4. <i>Surprise Butter Competitions,</i>	536
II.—REGISTER OF CREAMERIES, 1904-5,	539

With a view to encourage and assist improvement in the very important work of the management of creameries, the Department have decided :—

- (1.) To publish annually a register of suitably equipped and well-managed creameries and auxiliaries.
- (2.) To make provision during the winter for courses of instruction in dairy technology, with special reference to creamery management.
- (3.) To award certificates of competency to creamery managers under prescribed conditions.
- (4.) To hold annually a series of surprise butter competitions.

## I.—REGULATIONS, 1905-6.

1. *Registration of Creameries and Auxiliaries.*

The Department are prepared to consider applications for the registration of creameries and auxiliaries from managers and proprietors who desire to have their management recognised by the Department as efficient, and who may be in a position to train one or more pupils.

Applications from apprentices or pupils in creameries for admission to the examination for the Department's Creamery Managers' Certificates will be considered only in the case of those who have been trained in registered creameries under approved managers. (See page 530.)

\* Throughout these regulations the term "creamery" does not include auxiliaries where milk is separated and the cream sent elsewhere to be made into butter.

The conditions under which registration will be granted in the case of creameries\* are:—

- (1.) That the manager is capable.
- (2.) That strict cleanliness and order are manifest around the creamery, in the creamery, and in the persons of manager employes, and pupils.
- (3.) That a proper system of bookkeeping and business methods is in operation.
- (4.) That the buildings and equipment are suitable.
- (5.) That the premises and methods are at all times open to inspection by the Department.
- (6.) That defects indicated by the Department's Inspector are remedied with the least possible delay.
- (7.) That the butter packages in general use are satisfactory.
- (8.) That apprentices and pupils (if any) receive efficient training and instruction.
- (9.) That the creamery is entered for the Department's surprise butter competitions.

Registration of auxiliaries will be granted in the cases which fulfil the foregoing conditions (1) to (6) inclusive.

In considering applications for registration the Department will attach much more importance to cleanliness and order than to elaborate and expensive equipment. At the same time, due consideration will be given to the provision of an efficient equipment.

All creameries and auxiliaries, whether co-operative, joint-stock, or proprietary, may apply for registration.

Inspection of the creameries and auxiliaries will take place as speedily as possible.

The register will be subject to annual revision. It will be published annually, and will contain the names of each creamery and auxiliary accepted for registration on the result of the previous year's inspection, as well as the names of the manager, and of the president, chairman, proprietor, or general manager of the creamery or auxiliary.

The Department may, without assigning any reason, refuse to inspect or to register any creamery or auxiliary, and in all cases of dispute the Department's decision shall be final.

Applications for the registration of creameries and auxiliaries must be made on Form A 136, to be obtained from the Department, Upper Merrion-street, Dublin. The Forms, accurately filled in, should be forwarded so as to reach the offices of the Department on or before the last day of March, 1905. Applications after this date may be considered from managers who, having duly applied for the registration of their creameries, subsequently remove to creameries which have not applied for registration.

\* See footnote, page 528.

## 2. *Winter Courses of Instruction.*

During winter courses of instruction in the subjects of examination for the Creamery Managers' Certificates will be provided. Particulars will be published at a later date.

## 3. *Creamery Managers' Certificates.*

It is proposed to hold annually in March an examination for these certificates. The subjects of the examination are set forth on pages 531-535. Due notice of time and place will be given to applicants.

To these examinations will be admitted—

- (a.) Persons who for the whole season\* immediately preceding the examination have managed a registered creamery † to the satisfaction of the Department.
- (b.) Assistant managers, apprentices, and pupils who for the whole season immediately preceding the examination have worked in a registered creamery † under an approved manager, ‡ and who furnish a satisfactory certificate from him.
- (c.) Persons who for the whole season immediately preceding the examination have managed a registered auxiliary to the satisfaction of the Department.
- (d.) Students who have attended a full winter course of instruction approved by the Department.

[The following courses will be approved for the examination to be held in 1906 :—

- (1.) The winter courses for creamery managers provided at the Albert Agricultural College, Glasnevin, since 1902-3, inclusive.
- (2.) Any course of instruction during the winter 1905-6, which the Department may notify, at a later date, as approved.]

The Creamery Managers' Certificate will be granted to candidates of class (a) who are successful at the examination. A provisional certificate, which will be exchanged for the Creamery Managers' Certificate after the holder has, to the satisfaction of the Department, managed a registered creamery for at least one whole season, will be granted to the successful candidates of classes (b), (c), and (d).

The Managers' Certificate is renewable each year and may be withheld if, in the opinion of the Department, the holder, at any period fails in any respect to maintain a satisfactory standard of excellence in the management of a creamery under his care.

Candidates must be at least twenty years of age on the first day of October previous to the examination.

\* The Season shall be considered to begin on 1st April and to terminate on 31st October  
† See footnote page 528.

‡ An approved Manager is one who possesses the qualifications set forth in clause (a) above.

Applications for admission to the examination should be made not later than 31st January, 1906, on Form A 137, to be obtained from the Department, and must be accompanied by a deposit of £1, which will be returned if the candidate presents himself for examination, or if his application is not accepted.

Copies of the Forms of Certificate issued to successful candidates in 1904 are printed on pages 538-539.

## SUBJECTS OF EXAMINATION FOR CREAMERY MANAGERS' CERTIFICATES.

### i.—DAIRY FARMING.

#### *Soils.*

Suitability for dairy farming.

#### *Crops.*

Pasture, hay, green crops, forage crops, grain crops.

#### *Fertility of Soil.*

Sources of gain and loss to soil.

Farmyard manure.

Artificial manure.

#### *Stock.*

Pure-bred and half-bred cattle : suitability for dairying purposes

Selection of bull, of milk cows, of heifers.

Calf rearing.

Pigs : breeding and management.

#### *Housing of Stock.*

Cow-houses, best types.

Improvement of existing cow-houses.

Calf-houses.

Pig-houses.

Shelter sheds.

#### *Foods and Feeding.*

Home-grown and purchased foods : composition and uses.

Manurial value of feeding stuffs.

Separated milk and butter-milk as feeding stuffs.

#### *Milk Production.*

Circumstances affecting quantity and quality of milk

Summer and winter dairying.

#### *Diseases of Stock.*

The common ailments affecting dairy stock.

### ii.—PHYSICAL SCIENCE.

#### *Physics.*

Weighing and measuring.

The balance.

Graduated vessels.



*Physics*—(continued.)

Solids, liquids, gases.  
 Density, hydrometers.  
 The spring balance as a force-meter.  
 Friction, lubricants.  
 Centrifugal force.  
 Work and power—their measurement.  
 Fluid pressure: pumps, syphons, wells.  
 Effect of heat on the properties of matter.  
 Temperature and thermometers.  
 Evaporation and condensation.  
 Transfer of heat—conduction, convection, and radiation.  
 Heat a measurable quantity.  
 Units of heat, specific heat, latent heat.  
 Relation between pressure and boiling point.  
 Refrigeration—principles involved.  
 Heat and work.  
 Heat a form of energy.

*Chemistry.*

Fundamental principles.  
 Indestructibility of matter.  
 Simple and compound substances.  
 Chemical change.  
 Solution; precipitation; filtration; oxidation; reduction.  
 The atomic theory.  
 Chemical nomenclature.  
*The Atmosphere.*—Its composition; part it plays in combustion, and in vital changes.  
*Water.*—Composition, physical and chemical properties; natural waters.  
 Bases, acids, and salts; acidity and alkalinity—quantitative determination.  
 General knowledge of the Elementary Chemistry of the following substances and their compounds as met with in dairying:—  
 Potash, soda, lime, magnesia, ammonia, sulphuric acid, hydrochloric acid, borax, and boracic acid.  
 Lactic, butyric, and salicylic acids, formalin, amyl alcohol, albumen, casein, fats, milk-sugar.

## iii.—DAIRY BACTERIOLOGY.

Microscopical study of milk.  
 Experimental proof that souring of milk is due to bacterial activity.  
 Sources of bacterial contamination.  
 Care of milk; influence of temperature upon the keeping qualities of milk.  
 Biology of the commoner forms of bacteria, yeasts, and mould fungi.  
 Cultivation of bacteria and moulds; preparation of pure cultures.

**DAIRY BACTERIOLOGY—continued.**

- Disinfection and application of disinfectants.
- Bacterial examination of air, water, and dust.
- Injurious bacteria of milk; milk in relation to disease.
- Defects in milk due to improper feeding of cows.
- Methods of preserving milk; pasteurisation, sterilisation, filtration, refrigeration.
- Objections to the use of chemical preservatives.
- Cream-ripening; use of "starters."
- Importance of extreme cleanliness in dairies.
- Comparison of the bacterial contents of good and bad keeping butters.
- Bacterial faults in butter.
- Coagulation of milk.
- The part played by unorganised ferments and by bacteria, yeasts and moulds in cheese-ripening.
- Comparison of the ripening changes that take place in hard and in soft cheeses.
- Faults in cheese due to bacterial agency.
- Bacterial treatment of creamery sewage.

**iv.—DAIRY TECHNOLOGY.**

- Composition and properties of milk and its products, and of their constituents.
- Causes of variation in milk.
- Changes produced in milk and its products by heat and bacteria.
- Physical characteristics of good milk, cream, and butter.
- Sampling at farm and creamery; testing and analysis of milk, cream, butter, and cheese.
- Acidity and its estimation.
- Factory tests for quality of milk.
- Physical and chemical changes involved in the manufacture of cream, butter, and cheese.
- Preservation, conveyance, and marketing of milk.
- Cream raising and separation; the cream trade.
- Ripening of cream.
- Churning: conditions influencing yield and quality of butter.
- Washing, salting, and working of butter; packing for market.
- Conditions affecting quality of butter.
- Chilling, and cold storage.
- Separated milk and butter-milk: uses and value.
- Standards of quality for milk, cream, butter, buttermilk.
- Hard and soft cheese making: principles of manufacture; ripening and storage.

**v.—DAIRYING ENGINEERING.*****Buildings for Creameries.***

- Selection of site; general arrangement of a creamery to facilitate work; space required.
- Plans of creameries.
- Building materials.
- Ventilation; lighting; drainage.
- Approximate cost.

*Water Supply.*

Source; selection of a site for wells; sinking and lining of wells; artesian wells; suitability of water for dairy purposes; means of purification; storage.

*Sewage.*

Methods of disposing of creamery sewage.

*Machinery.*

Elementary fitting; packing of glands; adjustment of bearings; shafting and brackets; lining up of machines; tools required in a creamery.

*Boilers.*

Types of boilers; advantages and disadvantages of each.  
Size of boiler needed for central and auxiliary creameries; evaporative power.  
Insulation and setting of boilers.  
Fittings attached to boilers; their use and care.  
Usual defects in boilers.  
Firing and care of boiler; cleaning.  
Use of water-purifier.  
Various methods of economising steam.  
Feed-water heaters.

*Coal.*

Evaporative power of various qualities.  
How to judge coal.  
Consumption of fuel; economical stoking.

*Chimneys.*

Steel and brick; approximate cost; advantages and disadvantages of each.

*Steam Engine.*

Construction and management of ordinary non-condensing engine.  
Power required; steam consumption.

*Lubrication.*

Oils, greases, &c.  
Oil holders and filters.

*Machines.*

Various types of weighing machines, heaters, regenerative heaters, coolers, separators, tanks, vats, churns, pumps, butter-workers, refrigerating plants.  
Their capacity, construction, and approximate cost.

*Arrangement of Machinery.*

Transmission of power.

Care of belts; belt fasteners.

Pulleys and gearing.

Speed of various machines, and description of methods for increasing and reducing speed of machines.

*Arrangement of Work in a Creamery.*

Hands required.

## vi.—BUSINESS METHODS.

Office equipment.

General business terms and abbreviations.

Correspondence, care of; telegrams.

Postal regulations.

Business forms.

Banking: cheques, loans, overdrafts.

Railway rates, regulations and forms.

Purchase of materials—

Milk, valuation of.

Quotations for various goods required in a creamery.

Marketing of produce—

Market charges and regulations.

Trade routes.

Special requirements of various markets.

Insurance—fire, boiler, and employer's liability.

Advertising: quotations and circulars.

Calculations—

Yield.

Cost at each stage of manufacture.

Monthly estimates.

Comparison of returns from milk, cream, butter, and cheese trades.

Labour and wages.

Book-keeping—

Use and balancing various books used in creameries.

Preparation of returns.

Depreciation of allowances.

Balance sheet.

Allocation of profits.

The Sale of Food and Drugs Act; the Fertilisers and Feeding Stuffs Act, and amending Acts; the Employers' Liability Act; the Workmen's Compensation Act; the Factory and Workshops Act; the Pollution of Rivers Act; and so much of the Public Health (Ireland) Acts and the Friendly Societies Act as may be applicable to creameries.

#### 4. SURPRISE BUTTER COMPETITIONS.

A number of Surprise Butter Competitions will be held each year.

The object of these competitions is to induce creamery managers and others engaged in butter-making to give increased attention to every detail in the making and packing of butter, and particularly to cleanliness in every stage of the work. The reputation of Irish butter must depend on the degree in which these two essentials, viz., cleanliness and attention to details, are possessed by Irish buttermakers. But unless interest in the work can be increased and sustained, and unless those engaged in the industry bring into the work a certain amount of enthusiasm, accompanied by a desire and a determination to excel, the qualities which mark the successful buttermaker will not be perpetuated, and the possibilities of Ireland as a butter producer cannot be realised to the full. Fortunately, buttermaking is an occupation which becomes engrossingly interesting to those who have studied the numerous scientific problems which it presents to the thinking mind. The course of instruction for creamery managers has been instrumental in arousing interest in the scientific side of dairying, and it is hoped that these competitions may serve the further useful purpose of stimulating many creamery managers to greater sustained practical efficiency. They certainly should set up a standard of comparison by means of which buttermakers will be able to measure their progress towards perfection.

The following is the procedure which the Department intend to adopt.

On not more than eight and not less than five occasions each year the Department will forward to each person who enters for the competition a telegram requesting the recipient to send to an address in Dublin a box, keg, or kiel of butter made on the day the telegram is despatched. The butter at each competition may be judged one or more times by one or more competent and independent persons appointed by the Department.

Provided that the judges consider the exhibits show sufficient merit, the following prizes will be given in each competition on the basis of the highest total number of points, viz:—

Prizes for first class, . . . . .	£2 each.
Prizes for second class, . . . . .	£1 „

Until further notice the following scale of points will be adopted as the basis in judging:—

Flavour, . . . . .	60 points.
Texture, . . . . .	25 „
Colour, . . . . .	5 „
Packing and finish,* . . . . .	10 „
<hr/>	
Total, . . . . .	100 „

\* See Condition 8, page 538.

The following special prizes are offered in the case of exhibitors who comply with all the conditions of the competitions, and whose exhibits obtain not less than 90 per cent. of the maximum number of points obtainable during the year:—

To the manager of the creamery obtaining the highest number of points, . . . . .	£10
To the manager of the creamery obtaining the second highest number of points, . . . . .	£6
To the manager of the creamery obtaining the third highest number of points, . . . . .	£4
To the dairymaid or <i>actual</i> maker of the butter sent for competition during the year from the creamery obtaining the highest number of points, . . . . .	£3
To the dairymaid or <i>actual</i> maker of the butter sent for competition during the year from the creamery obtaining the second highest number of points, . . . . .	£2
To the dairymaid or <i>actual</i> maker of the butter sent for competition during the year from the creamery obtaining the third highest number of points, . . . . .	£1

In the event of two or more creameries obtaining the same total number of points during the year, or in any other circumstances which may arise, the Department reserve the right to allocate this sum of £26 in such manner as they may think fit.

All prizes will be paid at the end of the year.

#### CONDITIONS OF COMPETITION.

1. These competitions are open to butter made in any creamery in Ireland, whether co-operative, joint stock, or private, as well as to butter made in private dairies.

2. Applications must be made on Form A 136, which may be had from the Department, Upper Merrion-street, Dublin. The Forms, accurately filled in by intending competitors, who are required at the same time to enter their creameries for registration, should be forwarded so as to reach the offices of the Department on or before the last day of March, 1905, accompanied by a fee of £1, which will admit to all the competitions in one year.

Creameries which have been placed on the Department's register for 1904-5 are exempt from the payment of any fee for the competitions held in 1905.

3. The quantity of butter in each exhibit must be either 56 lbs., or 112 lbs., packed in a box, keg, or kiel, similar to those in regular use by the competitor.

*Competitors using boxes or other packages other than those in general use at their creameries will be disqualified from participating in any future competitions, and will forfeit any prizes that may have been awarded to their exhibits. They will also be debarred from entering their creameries for registration.*

4. The butter must be made on the day on which the telegram is despatched by the Department, and must be forwarded by passenger train, carriage paid, on that day.

5. The carrying Company's receipt must be transmitted to the Department by post on the day the exhibit is forwarded.

6. The butter sent in for competition will be paid for by the Department at the end of the season. The price given will be based on the current market rate prevailing for the various classes of butter at the date on which the telegrams are despatched, and shall be determined by the judges.

Any butter which reaches the Department in an unsatisfactory condition will not be paid for, but will be returned to the competitor at his own risk.

7. Butter containing more than 16 per cent. of water, or more than 3 per cent. of salt, will be ineligible for a prize.

8. Excepting the direction label supplied by the Department, there must be no mark or label in or on the package of butter, which might indicate its origin.

9. Creameries entered for the competitions must at all times be open to the inspection of the Department's officers.

10. Any departure from these rules will disqualify the competitor.

11. The Department may, without assigning any reason, refuse to accept for competition butter from any creamery or private dairy, and in all cases of dispute the Department's decision shall be final.

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## DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

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### CREAMERY MANAGERS' CERTIFICATES, 1904.

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#### COPIES OF FORMS OF CERTIFICATE AWARDED TO SUCCESSFUL CANDIDATES IN 1904.

##### I.

#### CREAMERY MANAGER'S CERTIFICATE.

(COPY.)

## DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

### CREAMERY MANAGER'S CERTIFICATE.

*Awarded*

to \_\_\_\_\_ on the results of the Examination held in 1904, and in consideration of his having managed the \_\_\_\_\_ Creamery to the satisfaction of the Department during the year 1903.

*This Certificate is renewable annually on the Conditions prescribed by the Department's Scheme for Improvement in the Management of Creameries.*

[Department's Seal.]

(Signed),

T. P. GILL, Secretary.

\_\_\_\_\_ 1904.

## II.

## PROVISIONAL CERTIFICATE.

(COPY.)

## DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

## EXAMINATION FOR CREAMERY MANAGERS' CERTIFICATES.

## PROVISIONAL CERTIFICATE.

*This is to certify that \_\_\_\_\_, of \_\_\_\_\_, having been successful at the Examination held in 1904, will be entitled to obtain the Department's Creamery Manager's Certificate upon shewing that he has since managed for at least one whole Season, to the satisfaction of the Department, a Creamery\* registered under the Department's Scheme for Improvement in the Management of Creameries.*

*T. P. GILL, Secretary.*

*Upper Merrion Street, Dublin,  
\_\_\_\_\_ 1904.*

*Prepd. \_\_\_\_\_*

*Exd. \_\_\_\_\_*

*—\* The term "Creamery" does not include auxiliaries where milk is separated and the cream sent elsewhere to be made into butter.*

## DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

## II.—REGISTER OF CREAMERIES AND AUXILIARIES—1904-5.

As a result of the inspection of creameries and auxiliaries from which applications were received in 1904 for registration under the Department's scheme for improvement in the management of creameries, the following have been placed on the Department's Register for 1904-5.

## REGISTERED CREAMERIES—1904-5.

Name and Postal Address of Creamery.	Name of Manager.	Name and address of President, Chairman, or General Manager of the Society or Company to which Creamery belongs.
ABINGTON Creamery (Co-operative Wholesale Society, Ltd.), Barrington's Bridge, co. Limerick.	CHARLES G. HARRIS,	<i>General Manager.</i> —W. L. STOKES, J.P., Mulgrave-street, Limerick.



REGISTERED CREAMERIES—*continued.*

Name and Postal Address of Creamery.	Name of Manager.	Name and Address of President, Chairman, or General Manager of the Society or Company to which Creamery belongs.
<b>AGHADOWNY</b> Co-operative Dairy Society's (Ltd.) Creamery, Drumcroon, Coleraine, co. Londonderry.	DANIEL SHERRAN,	<i>President.</i> —H. S. MORRISON, M.D., Belview, Blackhill, Coleraine.
<b>ANGLO-IRISH</b> Condensed Milk Company's (Ltd.) Creamery, Midleton, co. Cork.	R. H. WILKINSON,	<i>Chairman.</i> —W. G. WATSON, The Grange, Harold Wood, Essex.
<b>ARDAGH</b> Co-operative Dairy Society's (Ltd.) Creamery, Ardagh, co. Limerick.	JOHN SHERRAN,	<i>President.</i> —MICHAEL ENRIGHT, Kilreash, Ardagh.
<b>BALLINAHINCH</b> Creamery (Co-operative Wholesale Society, Ltd.), Newport, co. Tipperary.	WILLIAM F. O'BRIEN,	<i>General Manager.</i> —W. L. STOKES, J.P., Mulgrave-street, Limerick.
<b>BALLINAMORE</b> Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Ballinamore, co. Leitrim.	THOMAS M. GLENNON,	<i>President.</i> —Rev. DOMINICK M'BRENN, P.P., Ballinamore, co. Leitrim.
<b>BALLINARD</b> Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Ballinard, Shronell, co. Tipperary.	JOHN SHERRAN,	<i>President.</i> —Mrs. A. COOPER CHADWICK, Ballinard, Tipperary.
<b>BALLYBRICKEN</b> Creamery (Co-operative Wholesale Society, Ltd.), Grange, Kilmallock, co. Limerick.	DANIEL K. NOONAN,	<i>General Manager.</i> —W. L. STOKES, J.P., Mulgrave-street, Limerick.
<b>BALLYCANEW</b> Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Ballycanew, Gorey, co. Wexford.	E. L. KEATING,	<i>President.</i> —C. M. DOYNE, D.L., Wells, Gorey, co. Wexford.
<b>BALLYRASHANE</b> Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Coleraine, co. Londonderry.	JAMES LYON,	<i>President.</i> —JAMES STEWART MOORE, D.L., Ballydivity, Dervock, co. Antrim.
<b>BELLECK</b> Co-operative Agricultural and Dairy Society's Creamery, Belleek, co. Fermanagh.	DANL. J. M'SWEEENEY,	<i>President.</i> —C. J. TREDDENICK, Fortwilliam, Belleek.
<b>BOHERBUE</b> Creamery (Co-operative Wholesale Society, Ltd.), Boherbue, Banteer, co. Cork.	DENIS HEGARTY,	<i>General Manager.</i> —J. TURNBULL, 20, John-street, Cork.
<b>CASTLECAULFIELD</b> Co-operative Agricultural and Dairy Society's Creamery, Castlecaulfield, co. Tyrone.	WILLIAM BLAIR,	<i>President.</i> —COL. BURGESS, Pookonour, Castlecaulfield, co. Tyrone.

REGISTERED CREAMERIES—*continued.*

Name and Postal Address of Creamery.	Name of Manager.	Name and Address of President, Chairman, or General Manager of the Society or Company to which Creamery belongs.
CASTLECOR Dairy Company's (Ltd.) Creamery, Castlecor, Kanturk, co. Cork.	CORNELIUS KIELY, .	<i>Chairman.</i> —W. N. BARRY, J.P., Castlecor House, Castlecor, Kanturk.
CAVAN Creameries (Ltd.), Ballyhaise Creamery, co. Cavan.	JAMES GANNON, .	<i>President.</i> — Lieutenant-Genl. CLIFFORD, C.B., Carn Cottage, Ardlogher, Belturbet.
CENTENARY Co-operative Creamery Company's (Ltd.) Creamery, Ballyduff, Thurles, co. Tipperary.	RICHARD WALSH, .	<i>President.</i> — Rev. RICHARD FENNELLY, Castletown, Moyne, Templemore, co. Tipperary.
CLONES Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Clones, co. Monaghan	ALEXANDER B. HENRY,	<i>Chairman.</i> —JAMES WEST, J.P., Scotsboro House, Clones.
DONEGAL Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Donegal.	EDWARD C. SEMPLE,	<i>President.</i> —H. D. WARNOCK, M.D., F.R.C.S., Invereske, Donegal.
DROMCLOUGH Creamery (Co-operative Wholesale Society, Ltd.) Listowel, co. Kerry.	THOMAS J. BEARY, .	<i>General Manager.</i> — W. L. STOKES, J.P., Mulgrave-street, Limerick.
DROMORE Co-operative Agricultural and Dairy Society's Creamery, Dromore, co. Tyrone.	J. J. HURLEY, .	<i>President.</i> —JAMES WALLACE, Aughadarra, Dromore.
DRUMBANE Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Drumbane, Thurles, co. Tipperary.	HUGH P. RYAN, .	<i>President.</i> —Rev. W. CORCORAN, P.P., D.D., Drumbane, Thurles.
DRUMQUIN Creamery, Drumquin, co. Tyrone.	JOHN M'DERMOTT, .	<i>Proprietary Creamery belonging to</i> —Rev. T. L. F. STACK, B.D., Lower Langfield Rectory, Drumquin, co. Tyrone.
EFFIN Co-operative Agricultural and Dairy Society's Creamery, Newpark, Kilmallock, co. Limerick.	EDMOND O'LOUGHLIN,	<i>President.</i> —Rev. W. J. HIGGINS, P.P., Effin, Kilmallock, co. Limerick.
FEALEBRIDGE Creamery (Co-operative Wholesale Society, Ltd.) Fealebridge, Abbeyfeale, co. Limerick.	T. J. O'CONNOR, .	<i>General Manager.</i> — W. L. STOKES, J.P., Mulgrave-street, Limerick.
FINN VALLEY Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Crossroads, Killygordon, co. Donagal.	CHRISTOPHER B. DUFFY,	<i>President.</i> —Capt. JOHN RIKY, J.P., Mounthall, Killygordon.

REGISTERED CREAMERIES—*continued.*

Name and Postal Address of Creamery.	Name of Manager.	Name and Address of President, Chairman, or General Manager of the Society or Company to which Creamery belongs.
FREEMOUNT Dairy Company's (Ltd.) Creamery, Freemount, Charleville, co. Cork.	TIMOTHY O'CALLAGHAN,	<i>Chairman.</i> — JOHN MORTON, Lyre, Freemount, Charleville.
GLENWILLIAM Co-operative Dairy Society's (Ltd.) Creamery, Balingarry, co. Limerick.	TIMOTHY MULLINS, .	<i>President.</i> — T. D. ATKINSON, D.L., Glenwilliam Castle, Balingarry, co. Limerick.
GRANTSTOWN Creamery (Co-operative Wholesale Society, Ltd.), Grantstown, co. Tipperary.	JOHN O'DWYER, .	<i>General Manager.</i> — W. L. STOKES, J.P., Mulgrave-street, Limerick.
INVER Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Inver, co. Donegal.	PATRICK COLEMAN, .	<i>President.</i> — Rev. E. MAGUIRE, D.D., Inver.
IRVINESTOWN Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Irvinestown, co. Fermanagh.	WILLIAM R. IRWIN, .	<i>President.</i> — EDWARD ARCHDALE, D.L., Castle Archdale, Irvinestown.
KILCOMMON Creamery (Co-operative Wholesale Society, Ltd.), Kilcommon, Thurles, co. Tipperary.	JAMES C. DOHERTY,	<i>General Manager.</i> — W. L. STOKES, J.P., Mulgrave-street, Limerick.
KILFINANE Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Kilfinane, co. Limerick.	JOHN C. TURNER, .	<i>President.</i> — C. E. VANDELEUR, J.P., Springmount, Mallow, co. Cork.
KILLASNETT Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Lurganboy, Manorbhamilton, co. Leitrim.	EDWARD O'CALLAGHAN,	<i>President.</i> — Rev. S. M'TERNAN, P.P., M.R.I.A., Manorbhamilton
KILLEN Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Killen, Castlederg, co. Tyrone.	WILLIAM J. BEGGS, .	<i>President.</i> — JOHN RUTLEDGE, Ardbarron, Castlederg.
KILMALLOCK Creamery Company's Creamery, Kilmallock, co. Limerick.	THOMAS E. BENNETT,	<i>General Manager.</i> — THOMAS E. BENNETT, Kilmallock.
KILNALOCK Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Kilnaleck, co. Cavan.	CHARLES E. COSTELLO,	<i>President.</i> — ELLIOTT MOTHERWELL, J.P., Foxfield House, Kilnaleck, co. Cavan.

REGISTERED CREAMERIES—*continued.*

Name and Postal Address of Creamery.	Name of Manager.	Name and Address of President, Chairman, or General Manager of the Society or Company to which Creamery belongs.
KILTOGHERT Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Kiltoghert, Carrick-on-Shannon, co. Leitrim.	MARTIN BEIRNE, .	<i>President.</i> — Rev. MICHAEL NANGLE, C.C., Drumliffon, Kilclare, co. Leitrim.
KNOCKAVARDAGH and MOYGLASS, co. Tipperary, Co-operative Creamery and Butter Factory Company (Ltd.), Killenaule, Thurles, co. Tipperary.	RICHARD MURPHY, .	<i>President.</i> —Rev. R. FENNELLY, Castletown, Moyne, Templemore, co. Tipperary.
LAGAN Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Sallybrook, Manorcunningham, co. Donegal.	PATRICK M'MENAMIN,	<i>President.</i> —S. MARSHALL, J.P., Sallybrook, Manorcunningham.
LECKPATRICK Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Artigarvan, Strabane, co. Tyrone.	ANDREW H. SPRARMAN	<i>President.</i> —J. C. BOYD, M.B., Lifford, Strabane.
LIMAVADY Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Limavady, co. Londonderry.	WILLIAM ASHCROFT,	<i>Chairman.</i> —S. M. MACRORY, J.P., C.CLR., Ardmore and Newton Mills, Limavady.
LISBELLAW Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Lisbellaw, co. Fermanagh.	TIMOTHY NOONAN, .	<i>President.</i> —E. MITCHELL, M.P., Derryvullen, Enniskillen.
LISCARROLL Co-operative Dairy Society's (Ltd.) Creamery, Lis-carroll, Buttevant, co. Cork.	S. LOMBARD, .	<i>President.</i> —Rev. T. M'SWENEY, P.P., Churchtown, co. Cork.
LIXNAW Creamery (Co-operative Wholesale Society, Ltd.), Lixnaw, co. Kerry.	JOHN O'LEARY, .	<i>General Manager.</i> —W. L. STOKES, J.P., Mulgrave-street, Limerick.
LOUGHBRICKLAND Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Loughbrickland, co. Down.	ROBERT HYDE, .	<i>President.</i> —Rev. J. B. LUSK, The Manse, Glasker, Loughbrickland.
MONEYMORE Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Money more, co. Londonderry.	THOMAS SCOTT, .	<i>President.</i> — HENRY BYRNE, Money more, co. Londonderry.
OMAGH Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Omagh, co. Tyrone.	ARMER ALCOORN, .	<i>President.</i> —JOHN G. R. PORTER, J.P., Park-avenue, Omagh.

## REGISTERED CREAMERIES—continued.

Name and Postal Address of Creamery.	Name of Manager.	Name and Address of President, Chairman, or General Manager of the Society or Company to which Creamery belongs.
POMEROY Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Pomeroy, co. Tyrone.	JAMES GRANT, .	<i>Chairman.</i> —Col. R. J. G. LOWRY, D.L., Pomeroy House, Pomeroy.
PORTGLENONE Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Portglenone, co. Antrim.	WILLIAM WHARTON,	<i>President.</i> —J. B. STEWART, M.D., Portglenone, co. Antrim.
RAMELTON Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Ramelton, co. Donegal.	JAMES J. KELLY, .	<i>President.</i> —SAMUEL DAVIDSON, D.C., Ramelton, co. Donegal.
RATHKENNY Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Rathkenney, Ballymena, co. Antrim.	JAMES GREER, .	<i>President.</i> —JOHN M'CAY, M.D. Clough, Belfast.
SCOTTISH Co-operative Wholesale Society's (Ltd.) Creamery, Enniskillen, co. Fermanagh.	MAURICE WARD, .	<i>General Manager.</i> — W. R. WHYTE, Thistle Bank House, Enniskillen.
SHANERAGH Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Shaneragh, Dromore, co. Tyrone.	DENIS J. COSTELLOE,	<i>President.</i> —Rev. WALTER SCOTT, Brookfield, Clanabogan, Omagh.
SMERLA BRIDGE Creamery (Co-operative Wholesale Society, Ltd.), Smerla Bridge, Listowel, co. Kerry.	WALTER E. LESLIE, .	<i>General Manager.</i> —W. L. STOKES, J.P., Mulgrave-street, Limerick.
SOLOHEAD Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Limerick Junction, co. Tipperary.	J. J. O'HEA, .	<i>President.</i> — Rev. THOMAS O'DWYER, P.P., Solohead, Limerick Junction.
SPAMOUNT Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Spamount, Castlederg, co. Tyrone.	DAVID HICKEY, .	<i>President.</i> —Rev. A. LEITCH, Drumclaph Rectory, Castlederg, co. Tyrone.
SPRINGFIELD Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Enniskillen, co. Fermanagh.	ROBERT G. MARSHALL,	<i>President.</i> —CHRISTOPHER BRACKEN, The Graan, Enniskillen, co. Fermanagh.
URNEY Co-operative Agricultural and Dairy Society's (Ltd.) Creamery, Urney, co. Tyrone.	JOHN J. GALLAN, .	<i>President.</i> —JOHN O'FLAHERTY, J.P., The Grove, Urney, co. Tyrone.

## REGISTERED AUXILIARIES—1904-5.

Name and Postal Address of Auxiliary.	Name of Manager.	Name and Address of President, Chairman, or General Manager of the Society or Company to which Auxiliary belongs.
BLACKLION Auxiliary (Scottish Co-operative Wholesale Society, Ltd.), Blacklion. co. Cavan.	OWEN CORRIGAN, .	<i>General Manager.</i> — W. R. WHYTE, Thistle Bank House, Enniskillen.
BRAID Co-operative Agricultural and Dairy Society's (Ltd.) Auxiliary, Broughshane, co. Antrim.	WILLIAM J. GASTON,	<i>President.</i> —REV. ALEX. SLOAN, The Manse, Buckna, Broughshane.
CARNDONAGH Co-operative Agricultural and Dairy Society's (Ltd.) Auxiliary, Carndonagh, co. Donegal.	WILLIAM E. KNOX, .	<i>President.</i> —REV. JOHN DONERTY, Adm., Churchtown, Carndonagh, co. Donegal.
GARDINER'S CROSS Auxiliary (Scottish Co-operative Wholesale Society, Ltd.), Cornafanog, Lisbellaw.	JAMES MURPHY, .	<i>General Manager.</i> — W. R. WHYTE, Thistle Bank House, Enniskillen.
GLENFARNE Auxiliary (Scottish Co-operative Wholesale Society, Ltd.), Glenfarne, co. Leitrim.	DENIS SHEEHAN, .	<i>General Manager.</i> — W. R. WHYTE, Thistle Bank House, Enniskillen.
GOLA Auxiliary (Scottish Co-operative Wholesale Society, Ltd.) Lisbellaw, co. Fermanagh.	PATRICK O'SULLIVAN,	<i>General Manager.</i> —W. R. WHYTE, Thistle Bank House, Enniskillen.
IRONMILLS Co-operative Agricultural and Dairy Society's (Ltd.) Auxiliary, Cappawhite, co. Tipperary.	PATRICK O'KEEFE, .	<i>President.</i> —WILLIAM O'DWYER, Bonerea, Cappawhite.
"S" BRIDGE Auxiliary (Scottish Co-operative Wholesale Society, Ltd.), Tempo, co. Fermanagh.	WILLIAM ROSS MAGEE,	<i>General Manager.</i> —W. R. WHYTE, Thistle Bank House, Enniskillen.

## ROYAL COLLEGE OF SCIENCE, DUBLIN.

SESSION 1905-6.

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## SCHOLARSHIPS FOR STUDENTS IN AGRICULTURE.

A limited number of scholarships will be offered for competition among young men in Ireland who desire to acquire a thorough knowledge of technical Agriculture. Each scholarship includes— (1) free admission to the first year's course of instruction in the College, (2) one third-class railway fare to Dublin at the beginning of the session, and one third-class fare from Dublin at the end of the session, and (3) either of the following at the option of the Department (*a*) a maintenance allowance of one guinea per week while in attendance at the College; or (*b*) free board and residence at the Albert Agricultural College, Glasnevin; in the latter case a small grant will be made to each student towards the cost of books and apparatus.

A scholarship is tenable for one year, but selected candidates must undergo a probationary course of one term of about three months. If satisfactory progress can be made by the holder, the scholarship may be renewed for a second, and even for a third year, to enable the student to complete the agricultural course at the College.

The Department do not undertake to employ, or find employment for, students at the close of the period of training.

Holders of these scholarships will be subject to the regulations made from time to time at the Royal College of Science.

Candidates, who should be not less than 18 or more than 30 years of age on 1st September, 1905, must make application on a form, which may be obtained from the Department, or from the Registrar, Royal College of Science, Dublin, after the 1st January, 1905, and which should be returned not later than the 15th August, 1905.

Candidates must be free from any physical defect and have been born in Ireland or have been resident in Ireland for the three years immediately preceding the 1st June, 1905.

The examination will take place on the 6th, 7th, and 8th September, 1905, at the Royal College of Science, Stephen's Green, Dublin, and at the Albert Agricultural College, Glasnevin, commencing each day at 10.0 a.m. Expenses in connection with attendance at this examination will not be allowed.

Successful candidates may be required to submit themselves for examination by a medical officer appointed by the Department.

Candidates will be tested in the following:—

A.—ENGLISH.

- (1) Composition, to be tested by an essay.
- (2) Grammar, Etymology, and the principles of Syntax.
- (3) Literature, the following works:—(a) Macaulay's "Warren Hastings" (Intermediate School Texts, Browne and Nolan); (b) Thomson's "Winter."

B. One of the following:—

LATIN;  
IRISH;  
FRENCH;  
GERMAN.

In these languages the papers will comprise—

- (1) Passages for translation from the following texts:—  
 Latin—Cæsar "De Bello Gallico" (Book V.);  
 Irish—Beata Eogain Ruairí uí Súilleabháin leir an Aitir  
 pádraig ua Duinnín.  
 French—Xavier de Maistre, "Le Lepreux de la Cité  
 d' Aoste."  
 German—Hauff, "Das Wirthshaus im Spessart," Pitt  
 Press.
- (2) Easy passages for translation into English from other texts.
- (3) Questions in Grammar—Accidence and the principal rules of Syntax.
- (4) Short sentences for translation from English.

C.—MATHEMATICS.

- (1) Arithmetic—including elementary Mensuration.
- (2) Algebra—to quadratic equations inclusive;
- (3) Plane Geometry—to be tested partly by questions requiring formal proofs of propositions from Euclid I.-III., and partly by practical problems to be solved by compass and scale of equal parts.

D.—PRACTICAL AGRICULTURE.

Each applicant must have had substantial experience in the practical working of a farm. No technical knowledge of agriculture will be expected. The examination may be written, oral, and practical. The subjects will include all the ordinary routine work as practised on a dairy or tillage farm in Ireland.

N.B.—On no account will a scholarship be awarded to a candidate who fails to attain a high standard in this portion of the examination; while excellence in this subject will be taken into consideration in case of deficiency in one or more of the others.

E.—ABILITY TO IMPART INSTRUCTION.

Gauged by the style of answers in both written and oral examinations.



## MILKING QUALITIES OF HERDS.

DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET,  
DUBLIN, 7th February, 1906.

No. 30947-04.

SIR,—I have to acquaint you that the Department are desirous of collecting information regarding the milking qualities of the Herds of the breeders of pedigree Shorthorn Cattle in order to enable them to reply to applications from farmers in Ireland for advice as to where Shorthorn Bulls, bred from milking strains, can be procured.

The Department would accordingly be glad if you would facilitate them in this matter by furnishing replies to the appended queries in respect of the Shorthorn Herd kept by you.

I am, Sir,

Your obedient Servant,

T. P. GILL,  
*Secretary.*

To

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**QUERIES.**

- (1.) Do you keep a milk record?
- (2.) If so, how many cows are in your Herd, and on the milk register?
- (3.) What is the annual yield of milk per cow?
- (4.) Could you supply the Department with a copy of your milk register for the last year. (If so, please enclose copy).
- (5.) If you do not keep a milk register, will you kindly state whether your calves suckle their dams, or are hand-fed?
- (6.) How many Bulls, calved between the 1st September, 1903, and the 1st May, 1904, have you for sale?

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## THE MUNSTER INSTITUTE, CORK

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The classes at the Institute are open to female students only.

The course of training includes ;—

- I. The practice of dairy-work. The treatment of milk and the making of butter on a large and on a small scale with the most modern machinery and implements, as well as with the appliances generally used in farm dairies.
- II. Instruction in the feeding and management of cows, calves, and pigs ; in the keeping of small gardens, and in the manipulation and caring of bees.
- III. Instruction in poultry-keeping. Breeds ; their suitability for different purposes and different localities ; housing, feeding, and management ; hatching and rearing of chickens ; fattening, killing, plucking, trussing, and preparation for market.
- IV. Instruction in domestic work, embracing plain cookery, plain needlework, and laundry work.

The fee for one session is £3 3s., which covers cost of tuition, board and lodging.

Four sessions, each of about eleven weeks' duration, and commencing respectively in January, March, June, and October, are held in each year.

Intending students are required before admission to the Institute, to produce certificates of good health and character, and to pass an examination in the elements of English and Arithmetic.

Students are eligible for admission to a second consecutive session, provided they attain the required standard at the examination at the conclusion of the first session.

Students who have attended during two sessions, and who are desirous of qualifying for the position of Itinerant Instructor in butter-making or poultry-keeping under a County Committee of Agriculture and Technical Instruction are admitted to a third session on attaining the required standard at the second terminal examination, and satisfying the Department's examiner of their ability to impart instruction. If their progress during the third session is satisfactory they are admitted to a third session to enable them to complete their training.

Attendance during at least four sessions at the Institute is necessary to qualify students for admission to the examinations for Instructorships.

A limited number of free places and half-free places are awarded to the students who display special merit at the terminal examination of

the first session to enable them to avail of a second session entirely or partially free of expense. A few similar places are also offered to students who have attended two sessions at the Institute.

The students are at all times under the supervision of an experienced matron.

Applications for admission must be made on the prescribed form, which can be obtained from—

THE SECRETARY,

Department of Agriculture and

Technical Instruction for Ireland.

Dublin.

## II.—TECHNICAL INSTRUCTION.

DEPARTMENT OF AGRICULTURE AND

TECHNICAL INSTRUCTION FOR IRELAND,

UPPER MERRION-STREET, DUBLIN.

### SHORT SUMMER COURSES OF INSTRUCTION FOR TEACHERS, 1905.

Form S 41.

The Department will, during the summer vacation, conduct short courses of instruction for Teachers as under :—

- (1) Courses in Experimental Science, and in Drawing and Modelling, for Teachers in Day Secondary Schools and in Day and Evening Science and Art Classes.
- (2) Courses in Domestic Economy and in Manual Training (Woodwork and Metalwork) for Teachers of those subjects in Day Secondary Schools.
- (3) Courses, for Manual Instructors, in Woodcarving and Modelling, in Building Construction, and in Manual Training (Metalwork).
- (4) A course of instruction for Teachers of Lace and Crochet-making, Sprigging and Drawn Thread-work.

These courses will begin on the 11th July and close on the 4th August, and will be held in Dublin, Belfast, and Cork.

Should the applications exceed the accommodation, those applicants will be selected whose admission would appear to be most likely to prove beneficial. Applications from Teachers who have attended Short Courses of Instruction in previous years, and who have been giving instruction in the subjects of those courses during the present session, will have priority of claim for admission to advanced courses.

It is important that teachers should not apply unless they know that they will be able to attend, for great difficulties, as well as injustice to others, may be entailed by applicants failing to take advantage of admission which may be granted. Failure to attend the course after the invitation has been accepted, will, except in the case of illness, be regarded as an abuse of the privilege; and any Teacher failing in this respect will be debarred from attending any future course.

Teachers who are selected for, and who attend the courses of instruction regularly and punctually at the specified hours, from the beginning to the end of the course, will be allowed a sum of £3 10s. towards their expenses while living at the centre; and those who travel more than twenty miles to the centre of instruction will be allowed, in addition, Third Class Railway Fare for one journey to and fro between the railway station nearest their school and Dublin, Belfast, or Cork, as the case may be; no car fares, or other travelling expenses will, however, be allowed. These allowances will in no case be made until after the conclusion of the courses.

The hours of attendance will be from 10 a.m. to 4 p.m. daily (with an interval of one hour for lunch), except on Saturdays, when the hours will be from 10 a.m. to 1 p.m. In addition, Teachers will be required in the evenings to write out notes, &c.

Teachers desiring to take advantage of these courses must fill up and return the appropriate form of application (*see pages 551, 552, and 555*) as early as convenient, but in any case so as to reach the Offices of the Department not later than the **31st March**.

N.B.—These Courses are open only to Teachers who are over eighteen years of age, and who are engaged (a) by Local Committees of Technical Instruction; or (b) in Schools receiving grants either directly from the Department or under the provisions of an approved local Scheme of Technical Instruction.

#### DETAILS OF THE COURSES.

##### I. (a).—*Experimental Science.*

There may be thirteen courses of instruction in Experimental Science.

*Subjects* :—First and Second Years of the Preliminary Course; Third and Fourth Year Courses in Physics, Chemistry, Mechanical Science, Botany, and Physiology and Hygiene, and a course in Geology.

These courses will not only cover the subject matter of the syllabuses of the Department's programme for Day Secondary Schools, but will aim directly at bringing home to Teachers the intentions of the Department as expressed in the prefatory note thereto.

Provisional certificates of competency to teach the subject of the course will be issued to those Teachers who have punctually and regularly attended, and successfully done the class work, as testified by laboratory note books, and by any examination—written, *viva voce*, or practical—which it may be desirable to hold.

Application for admission to these courses must be made on Form S.

### I. (b).—*Drawing and Modelling.*

The course of instruction in Drawing and Modelling will be specially devoted to enabling Teachers to secure the Irish Secondary Teachers' Drawing Certificate (*see Circular Letter No. 16*) ; but instruction of a more advanced character will be afforded to those Teachers who are already qualified for this certificate, or who hold higher certificates.

Teachers must not regard attendance at these courses as sufficient qualification to give instruction in the Department's Programme of Drawing. They should continue their studies throughout the winter, and present themselves for examination in the subjects required for the Irish Secondary Teachers' Drawing Certificate, at the annual examinations of the Board of Education, South Kensington, held in April, May, and June. The Regulations for the admission of External Candidates to these examinations are given on Form S. 100, copies of which may be obtained on application.

Application for admission to this course must be made on Form S. 42.

### II. (a).—*Domestic Economy.*

In order to facilitate the introduction of this subject into the curriculum of Day Secondary Schools, the Department propose to arrange for short summer courses of instruction in Domestic Economy for Teachers who have already obtained provisional recognition to give instruction in the First and Second Year Syllabuses of the Preliminary Course of Experimental Science. The course of instruction this year will include Cookery, the elements of Physiology and Hygiene, and Needlework.

Recognition to teach Domestic Economy in Day Secondary Schools during the Session 1905-6 will be given to those teachers who have punctually and regularly attended, and successfully done the class work, as testified by note books and by any examination—written, *viva voce*, or practical—which it may be desirable to hold. Teachers who successfully attend three Summer Courses in Domestic Economy, under the conditions referred to above, and who teach this subject for two complete sessions to the satisfaction of the Department's Inspectors, will be recognised as qualified to give instruction, in Day Secondary Schools, in the Preliminary Course of the Department's Programme of Experimental Science and in the Syllabuses of Domestic Economy.

Application for admission to this course must be made on Form S 42.

### II. (b).—*Manual Instruction (Woodwork and Metalwork).*

The courses of Manual work will include instruction in Drawing, in addition to practical instruction in the use of Woodworking and Metalworking tools, and will provide for the further training of Teachers who at present teach these subjects in Day Secondary Schools, or who will be engaged as instructors during the forthcoming session. Examinations will be held at the conclusion of the courses, and Teachers who succeed in passing these examinations will, for the present, be accepted as qualified to give instruction in the subjects under the Department's Regulations for Day Secondary Schools, subject to the conditions of Circular 24 (*see page 554*).

Manual Instructors are eligible for admission to the course in Manual Instruction (Metalwork) and if successful at the examinations will be entitled to provisional certificates similar to those granted to Secondary School Teachers.

Application for admission to these courses must be made on Form S 42.

### III.—*Wood-carving and Modelling; Building Construction.*

These courses are intended primarily for the further training of Manual Instructors who are at present under engagement to Local Committees of Technical Instruction. A certificate of satisfactory attendance and progress will be issued to those who are favourably reported upon by the Instructors in charge; but it is not the intention of the Department to issue Teachers' Certificates upon the results of the courses.

Application for admission to these courses must be made on Form S 42.

### IV.—*Course of Instruction for Teachers of Lace and Crochet Making, Sprigging, and Drawn Threadwork.*

The object of the present course is to improve existing kinds of work, and not to introduce new forms. The instruction will be confined to—

- |                    |                                     |
|--------------------|-------------------------------------|
| A. Limerick Laco.  | C. Raised Crochet.                  |
| B. Clones Crochet. | D. Sprigging and Drawn Thread Work. |

The lessons on each of these subjects will include instruction in Technique and the use of suitable materials; Drawing and the preparation of working tracings; and, in the case of those capable of profiting by such form of instruction, practice in Design. In the case of crochet workers special instruction will be given in the artistic arrangement of traditional crochet details ordinarily used by workers. Exercises will be given in which the actual units will be employed, and drawings will be made from such arrangements as prove satisfactory.

Certificates of proficiency will be awarded at the close of the Course to those who have attended regularly and worked well, and whose work is of a sufficiently high standard, as shown by the specimens produced during the class-lessons, and by any tests of a written or practical character which it may be considered advisable to apply.

Teachers attending this course will be required to bring their usual working material with them, as well as pencils, india-rubber, compasses, a twelve-inch ruler, two set squares (one of 45° and the other of 60°), and a medium-sized drawing book. Teachers of crochet making should also provide themselves with sets of such details as they are accustomed to work for the trade, as for example, the "Scroll," "Lily," "Hawthorn," "Shamrock," "Stem," "Branch," Rosettes of various forms, &c.

Application for admission to this course must be made on Form S 140.

DEPARTMENT OF AGRICULTURE AND TECHNICAL  
INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET,  
DUBLIN, *March*, 1905.

QUALIFICATIONS OF TEACHERS OF MANUAL  
INSTRUCTION.

SIR,

Circular 24.

As Manual Training has now been included in a large number of approved Schemes of Technical Instruction, and is being more generally introduced into Day Secondary Schools which have adopted the Department's Programme, it has been deemed advisable to make arrangements by which persons desirous of becoming teachers of this subject in Ireland might obtain from the Department permanent recognition of their qualifications. Hitherto the recognised certificates in Manual Training have been those granted in the two branches of Woodwork and Metalwork by the City and Guilds of London Institute. There were, however, in this country, when local Schemes were first put into operation, very few persons holding these certificates, and the Department found it necessary during the past three years to organise special courses of training in order that a sufficient number of teachers might be forthcoming. These courses were of a provisional character, and the certificates issued at their conclusion do not constitute a permanent qualification until certain conditions have been fulfilled. The Department have, therefore, decided, subject to the provisions set forth in Appendix A. to this circular letter, to issue the following certificates of permanent qualification :—

1. The Irish Manual Instructors' Certificate (Woodwork).
2. The Irish Manual Instructors' Honours Certificate (Woodwork).

Each of these Certificates will entitle the persons to whom they have been granted to recognition by the Department as fully qualified Manual Instructors in Woodwork. Persons holding the Teachers' Certificates in Manual Training (Woodwork) and in Manual Training (Metalwork), issued by the City and Guilds of London Institute will, as heretofore, be recognised as fully qualified Instructors in the subjects for which they hold the certificates, while persons holding the Teachers' Higher Certificate (Woodwork or Metalwork) of the Board of Examinations for Educational Handwork will be recognised as qualified to teach that subject.

The Department will also grant, on compliance with the prescribed conditions :—

3. The Irish Secondary Teachers' Manual Training Certificate (Woodwork); and
4. The Irish Secondary Teachers' Manual Training Certificate (Metalwork).

Teachers holding these Certificates will be permanently recognised as qualified to give instruction in the subject of the certificates in classes conducted in accordance with the Department's Programme for Day Secondary Schools.

**SPECIAL EXAMINATION FOR TEACHERS' QUALIFICATIONS IN  
MANUAL TRAINING (WOODWORK).**

In order that facilities for obtaining recognition may be afforded candidates who have not attended one of the Department's Special Courses of instruction, or who have been unable to comply with the conditions laid down in connection with the Certificates of the City and Guilds of London Institute, the Department will, for the present, in June of each year, hold a special examination in Manual Training (Woodwork). The Syllabuses of the subjects of examination are set out in Appendix B. to this circular letter; and the standard required will be at least equal to that of the Examination for the Teachers' Certificate of the City and Guilds of London Institute. Persons, therefore, who have not had adequate previous training, should not present themselves for examination.

Application for admission to the Special Examination must be made on the prescribed form (No. S. 32) before the 1st May preceding the examination. Copies of the form and information as to the exact dates on which the examination will be held may be obtained after the 1st March each year.

Recognition of provisional certificates awarded by the Department will be withheld after five years from the date of the certificate in the case of those teachers who have not obtained one of the approved certificates mentioned above. Such provisional certificates granted previous to the issue of this circular letter will, however, be exchanged for permanent certificates in accordance with the conditions under which they were issued.

Particulars of the certificates and examinations of the City and Guilds of London Institute may be found in the Programme of the Department of Technology of the Institute, which may be obtained (price 9d., post free 1s.) through any bookseller, or direct from the publisher, John Murray, Albemarle-street, London, W.

The Syllabuses of the subjects of the Board of Education's examinations may be obtained (price 4d.) through any bookseller, or direct from E. Ponsonby, 116 Grafton-street, Dublin. The regulations respecting the admission of candidates to these examinations, and the dates of the examinations in the various subjects may be obtained, after the 1st of January of any year, upon application to the Department.

I am, Sir,

Your obedient Servant,

T. P. GILL,

*Secretary.*



## APPENDIX A.

## 1.—THE IRISH MANUAL INSTRUCTORS' CERTIFICATE (WOODWORK).

This Certificate will be awarded to candidates who have successfully attended one of the Department's Special Courses of Instruction in Manual Training, or who have successfully passed the Special June Examination, and who have—

(1.) subsequently taught Manual Instruction to the satisfaction of the Department's Inspectors for not less than two complete sessions as wholtime Officers of County, County Borough, or Urban District Technical Instruction Committees: and

(2.) obtained, since the 1st January, 1900, successes in at least three of the subjects named below, of which not more than two may be in Group I. :—

## GROUP I.—EXAMINATIONS OF THE BOARD OF EDUCATION.

Geometrical Drawing and Drawing on the Blackboard (to count as one subject).

Freehand Drawing.

Model Drawing.

Drawing in Light and Shade.

Perspective.

Architecture.

Architectural Design.

Modelling Design.

## GROUP II.—EXAMINATIONS OF THE BOARD OF EDUCATION.

*(A success lower than a First Class Pass in Stage I. will not be accepted.)*

Practical Plane and Solid Geometry.

Machine Construction and Drawing.

Building Construction.

## GROUP III.—EXAMINATIONS OF THE CITY AND GUILDS OF LONDON INSTITUTE.

*(A success lower than a First Class Pass in the Ordinary Grade will not be accepted.)*

Carpentry and Joinery.

Ship Carpentry and Joinery.

Cabinet Making.

Wheelwright's Work, and Van and Cart Building.

Road Carriage Building.

## 2.—THE IRISH MANUAL INSTRUCTORS' HONOURS CERTIFICATE (WOODWORK).

This Certificate will be awarded to candidates eligible for the Irish Manual Instructors' Certificate (Woodwork) who obtain successes in at least two of the subjects of Groups II. and III., being first class successes in Stage 2 (or higher successes) of subjects in Group II., or first class successes in Honours in subjects of Group III.

### 3.—IRISH SECONDARY TEACHERS' MANUAL TRAINING CERTIFICATE (WOODWORK).

Short Courses of Instruction in Manual Training (Woodwork) for Teachers of the subject in Day Secondary Schools are conducted by the Department annually during the month of July. Provisional certificates of recognition as Teachers of Manual Training in Day Secondary Schools are awarded to those who attend satisfactorily, and pass the examinations held at the close of the course. This provisional certificate will be exchanged for the Irish Secondary Teachers' Manual Training Certificate (Woodwork) in the case of those teachers who have—

- (1.) subsequently taught Manual Instruction to the satisfaction of the Department's Inspectors for at least two complete sessions in Day Secondary Schools on the Department's list; and
- (2.) obtained, since 1st January, 1900, successes in at least two of the examinations specified for the Irish Manual Instructors' Certificate (Woodwork).

### 4.—THE IRISH SECONDARY TEACHERS' MANUAL TRAINING CERTIFICATE (METALWORK).

Teachers who have been recognised as qualified to give instruction in Manual Training (Woodwork) in Day Secondary Schools will be eligible for admission to the Special Short Summer Courses of instruction in Manual Training (Metalwork). Provisional certificates of recognition as Teachers of Manual Training (Metalwork) in Day Secondary Schools will be awarded to those who attend satisfactorily, and pass the examinations held at the close of the course. This provisional certificate will be exchanged for the Irish Secondary Teachers' Manual Training Certificate (Metalwork) in the case of those Teachers who have—

- (1.) subsequently taught Manual Instruction (Metalwork) to the satisfaction of the Department's Inspectors for at least two complete sessions in Day Secondary Schools on the Department's list; and
- (2.) obtained, since the 1st January, 1900, successes in at least two of the subjects named below, being successes higher than, or in subjects other than, those accepted towards the Irish Secondary Teachers' Manual Training Certificate (Woodwork).

#### GROUP I.—EXAMINATIONS OF THE BOARD OF EDUCATION.

Geometrical Drawing and Drawing on the Blackboard (to count as one subject).

Freehand Drawing.

Model Drawing.

Drawing in Light and Shade.

Perspective.

**GROUP II.—EXAMINATIONS OF THE BOARD OF EDUCATION.**

*(A success lower than a First Class Pass in Stage I. will not be accepted.)*

Practical Plane and Solid Geometry.  
Machine Construction and Drawing.  
Applied Mechanics.  
Metallurgy.  
Steam and the Steam Engine.

**GROUP III.—EXAMINATIONS OF THE CITY AND GUILDS OF LONDON INSTITUTE.**

*(A Success lower than a First Class Pass in the Ordinary Grade will not be accepted.)*

Metal Plate Work.  
Iron and Steel Manufacture.  
Mechanical Engineering.  
Boilermakers' Work.  
Plumbers' Work.

**APPENDIX B.**

**SPECIAL EXAMINATION FOR TEACHERS' QUALIFICATIONS IN MANUAL TRAINING (WOODWORK).**

**SYLLABUSES.**

**DRAWING (100 marks).**

Finished Scale Drawings of simple joints, or combinations of joints. Representations on paper of solids in various positions, in plan, elevation, section, isometric and oblique projection.

**THEORY (100 marks).**

A written paper on the following subjects :—

Woods : nature, growth, supplies, cost, diseases, use, &c.  
Tools : construction and uses.  
Manual Training : aim and object.  
Class Management.  
Workshop arrangement, equipment and cost.

Candidates should be able to illustrate their answers by freehand sketches.

**PRACTICAL WOODWORK TEST (100 marks).**

The construction of joints, or combination of joints, from given dimensioned drawings or sketches.

The accuracy of dimensions, accuracy of fitting, and time taken, will be considered,

**DRAWING ON THE BLACKBOARD (50 marks).**

Drawings—freehand and to scale—of subjects for class lessons, common joints, &c.

**DEMONSTRATION EXERCISE (50 marks).**

Short lesson for a class on a given subject in Woodwork, Drawing, or Theory.

To pass, Candidates must obtain not less than 50 per cent. of the total number of marks, and not less than 40 per cent. of the marks allotted to any subject, and not less than 50 per cent. in the case of the Demonstration Exercise.

**DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND  
UPPER MERRION-STREET, DUBLIN.**

**SPECIAL EXAMINATION FOR TEACHERS' QUALIFICATIONS IN MANUAL TRAINING (WOODWORK).**

**Form S. 31.**

A special examination for Teachers' qualifications in Manual Training (Woodwork) will be held in Dublin on Tuesday and Wednesday, 27th and 28th June, 1905. The Subjects and Time Table of the examination will be:—

Tuesday, June 27th,	10 a.m. to 1.30 p.m.,	Drawing.
" "	2.15 to 5.15 p.m.,	Theory.
Wednesday, June 28th,	10 a.m. to 1 p.m.,	Practical Woodwork Test.
" "	2 to 5 p.m.,	Drawing on the Blackboard and Demonstration Exercise.

For Syllabuses of the subjects of examination see circular letter No. 24 (see page 554).

Tools, wood, paper, pens, and ink will be provided by the Department, but candidates will be required to bring mathematical instruments, drawing boards (Imperial size) pencils, erasers, &c., for the examination in Drawing; and, although tools for the Practical Woodwork Test will be provided by the Department, candidates are advised to bring their own, as no allowance can be made should the candidate not consider the tools supplied as satisfactory.

Application for admission to the examination must be made on Form S. 32, before the 1st May.

No fee will be charged for this examination, but candidates will be required to defray all travelling and other expenses incurred by them.

DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET,  
DUBLIN, *March*, 1905.

## QUALIFICATIONS OF TEACHERS OF DOMESTIC ECONOMY IN DAY SECONDARY SCHOOLS.

SIR OR MADAM,

*Circular 25.*

The Department have made arrangements by which, it is hoped, the teaching of Domestic Economy in Day Secondary Schools for Girls may be extended and improved. Hitherto grants in respect of attendances at instruction in this subject could be obtained only when it was taken in conjunction with the two-year Preliminary Course, or one of the Special Courses, of Experimental Science and Drawing of the Department's Programme. Grants will still be paid according to the Regulations hitherto in force; but, during the third and fourth years, Domestic Economy may also be taken as one of the Special Courses, and, provided that the regulations prescribed for such courses are duly complied with, grants will be payable according to the scale fixed for Special Courses in Experimental Science.

In view of these arrangements it has been deemed advisable to reconsider the question of the qualifications of teachers, and to provide specially for the case of Day Secondary Schools by offering facilities to persons desirous of being recognised as Teachers of Domestic Economy in Day Secondary Schools.

Those persons will be recognised as fully qualified teachers of Domestic Economy, who have obtained the Diploma of the Irish Training School of Domestic Economy, or who hold the Cookery Teachers' Full Diploma issued by the Board of Education, London, together with full certificates in Laundrywork and Dressmaking from an approved Training School of Domestic Economy. A list of the Training Schools recognised for the purpose of this qualification is printed as an appendix to this circular letter.

Persons who do not hold the Diplomas or Certificates specified, but who are otherwise able to satisfy the Department that they are sufficiently qualified, may receive exceptional recognition; but exceptional recognition will not be granted to any applicants who cannot submit satisfactory evidence of having received such a course of training as would fit them to give instruction in Domestic Economy.

### SPECIAL PROVISIONS FOR RECOGNITION OF TEACHERS OF DOMESTIC ECONOMY IN DAY SECONDARY SCHOOLS.

With a view to affording opportunities to persons desirous of being recognised as Teachers of Domestic Economy in Day Secondary Schools, but who have been unable to obtain the Diploma and Certificates above mentioned, the Department will be prepared to grant provisional recognition in this subject to those who have—

- (1.) successfully attended special Summer or other recognised teaching courses of instruction in the subjects of the two-year Preliminary Course of Experimental Science; and
- (2.) successfully attended a Summer Course in Domestic Economy consisting of not less than 100 hours' practical instruction,

Provisional recognition so obtained may be converted into permanent recognition in the case of persons who, having complied with conditions (1) and (2) above, attend successfully two further Summer Courses in Domestic Economy, provided that they shall also have given instruction in Domestic Economy for two complete school sessions to the satisfaction of the Department's Inspectors. Such persons will receive the Irish Secondary Teachers' Science Certificate, entitling them to give instruction in Domestic Economy and in the two-year Preliminary Course of Experimental Science in accordance with the Department's Regulations for Day Secondary Schools. This certificate, however, will not be accepted as evidence of qualification to give instruction in Technical Schools and Classes.

Should any teacher recognised in accordance with the foregoing conditions discontinue from any cause the teaching of Domestic Economy under the Department's Regulations throughout a period of five years the recognition granted will lapse.

I am, Sir (or Madam),

Your obedient Servant,

T. P. GILL,  
*Secretary.*

## APPENDIX.

### LIST OF TRAINING SCHOOLS OF DOMESTIC ECONOMY, THE CERTIFICATES OF WHICH ARE RECOGNISED BY THE DEPARTMENT.

Edinburgh : School of Cookery, &c., Limited, 3, Atholl-crescent, Edinburgh.

Glasgow : Training School of Cookery, &c., 86, Bath-street, Glasgow.

Glasgow : West End Training School of Cookery, &c., 2, Dalhousie-street, Glasgow.

Liverpool : Training School of Cookery, Colquitt-street, Liverpool.

London : Battersea Polytechnic Training School of Domestic Economy, Battersea, London, S.W.

London : National Society's Training School of Cookery, Lambeth London, S.E.

London : National Training School of Cookery, Buckingham Palace-road, London, S.W.

Newcastle-on-Tyne : Northern Counties Training School of Cookery, New Bridge-street, Newcastle-upon-Tyne.

All communications respecting these Schools must be addressed to the Secretaries.

DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET,  
DUBLIN, *February, 1905.*

Circular 35.

LACE AND CROCHET INDUSTRY, SEASON 1905.

SIR, OR MADAM,

I have to inform you that, with a view to affording information and guidance to the Lace and Crochet Classes in Ireland generally, the Department have recently instituted inquiries as to the probable needs of the Lace and Crochet Market for the ensuing season, in order that Managers may be in a position to direct the attention of the workers to the branches of the industry which would, in all probability, prove most remunerative to them.

The results of these inquiries are summarised in the form of a brief memorandum, printed as an appendix to this circular letter. Special attention is drawn to the fact that all the large firms who were approached on the subject, were united in their condemnation of the almost universal practice of forwarding, for the purpose of sale, indifferent, and even bad, work. Only the best work produced should be placed on the market, otherwise it will inevitably react unfavourably upon the workers. Once a bad reputation has been established—as is bound to be the case should the practice alluded to be persisted in—great damage will be done to the trade. Managers should maintain the utmost vigilance in this respect, and point out to the workers the short-sightedness of the policy of not putting their best energies into their work.

I have to add that the Department hope to be in a position to give more detailed information as to the fashions for the approaching season when they have been more fully declared.

I am,

Sir, or Madam,

Your obedient Servant,

T. P. GILL,

*Secretary.*

APPENDIX.

MEMORANDUM AS TO TRADE REQUIREMENTS OF THE  
LACE AND CROCHET INDUSTRY, AND SUGGESTIONS  
FOR 1905.

*Clones Crochet.*

Fine Crochet is at present in steady demand, and Clones Crochet of good and uniform quality commands a good market. Indeed, it may be said to be, at present, the most important branch of the Irish Lace and Crochet Industry.

*Raised Crochet.*

Raised Crochet, of good technique, with the small details tastefully arranged, is also in request. Freshness and variety of design are, however, essential, and, while ornamental effect should be sought after in a certain orderly arrangement of design, stiffness and formalities should be avoided.

*Coarse Heavy Crochet.*

There is very little demand for coarse crochet, and it can only be sold at a very low price. This is chiefly due to the fact that much inferior work, defective in form, texture, and arrangement, has been placed on the market. The exclusion of inferior work is now essential to the maintenance of the high reputation of Irish Crochet and the preservation of a regular market.

*Carrickmacross Lace.*

Carrickmacross Lace has also suffered from over-production, and the placing on the market of inferior work. The market has been so flooded with ill-sewn, ill-finished specimens of this lace, as to bring it into general disfavour. Moreover, the perishable nature of the lace, and its relatively high price, combine to place it at a disadvantage when compared with, for instance, Belgian applique lace.

There is a limited market for really good work of fine quality, but, as the supply is now fully equal to the demand, it is not considered desirable that there should be any further extension of the Carrickmacross Lace industry.

*Limerick Lace.*

Limerick Lace is still a marketable commodity. It is preferred to Carrickmacross Lace on account of its durability; but to retain a really good market a reversion to the styles current in the "Forties" and "Fifties" is recommended, in addition to the employment of modern designs.

*Embroidery.*

It is anticipated that fine embroidery will be in considerable request during the coming season, and that there will be a good demand for sprigging and *Broderie Anglaise*, or cut-work for dress purposes. The quality must, however, be consistently good.



## NOTES AND MEMORANDA.

There was a Meeting of the Council of Agriculture on Thursday, 9th February, (see pp. 409 *et seq.*), and the Agricultural Board met on Wednesday, 25th January, and again on Wednesday, 8th February.

**Meetings of Council and Boards.**

A limited number of scholarships will be offered for competition among young men in Ireland who desire to acquire a thorough knowledge of technical Agriculture. A scholarship is tenable for one year, but selected candidates must undergo a probationary course of one term of about three months. If satisfactory progress be made by the holder, the scholarship may be renewed for a second, and even for a third year, to enable the student to complete the agricultural course at the College. Full particulars are given on p. 546.

**Scholarships for Students in Agriculture**

The Department of Agriculture and Technical Instruction for Ireland, by virtue and in exercise of the powers in them vested under the Agriculture and Technical Instruction (Ireland) Act, 1899, the Diseases of Animals Acts, 1894 to 1903, and of every other power enabling them in this behalf have issued, under date 28th March, 1905, an Order entitled "The Sheep-Scab (Ireland) Order of 1905," and another Order, "The Sheep Scab (Local Regulations) (Ireland) Order of 1905." Copies of these Orders can be had, free of charge and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland (Veterinary Branch), Castle-street, Dublin.

**The Sheep-Scab (Ireland) Orders of 1905.**

As part of their scheme for Improvement in the Management of Creameries, the Department have decided to publish annually a Register of well-managed creameries and auxiliaries. The Register for 1904-5, which has just been issued, contains the creameries and auxiliaries that have been accepted for registration on the results of the inspections carried out in connection

**Scheme for Improvement in the Management of Creameries.**

with the scheme during last season. The regulations of the scheme for the coming year (1905-6) have also been issued. These regulations have reference to the following matters:—

- (1.) The conditions under which Registration will be granted in the case of creameries and auxiliaries.
- (2.) Winter courses of instruction in Dairy Technology.
- (3.) Examination for Creamery Managers' Certificates, 1906.
- (4.) Surprise Butter Competitions, 1905.

The pamphlet containing the Register for 1904-5, and the Regulations of the Scheme for 1905-6 is reprinted on pp. 528 *et seq.*

Separate copies of the pamphlet may be obtained free of charge on application to the Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin.

The Department have recently investigated the question of the suitability of the cultivation of beet in Ireland. Though the Department's inquiries are not yet complete, it would appear, in view of the facts detailed below that the sugar-beet industry is not generally suited to this country, and could be profitable only in certain districts, if at all.

It is generally admitted that the least capacity of a profitable factory is 40,000 tons of sugar beet per season. The increased cost of production in a smaller factory would render the undertaking unprofitable. To produce 40,000 tons of sugar beet there must be over 2,500 statute acres devoted yearly to this crop. Attacks of parasites of an animal and vegetable nature (nematodes, beet fly, and fungi, such as *Phoma betae*) seriously impair at times the value of the crop. The danger of such attacks is increased when sugar beet is grown too often on the same land, and hence it is not advisable to grow beet oftener than once in four years on the same field. In other words, for a factory of 40,000 tons capacity there would need be 10,000 statute acres under cultivation, of which one-quarter would be annually cropped with beet.

All the roots must be produced within a short distance of the factory, otherwise the cost of transit materially reduces the net price realised by the farmer for his beet.

A deep loamy soil with fairly open sub-soil is most favourable for beet cultivation. The cost of preparation of the land is heavy,

for unless the soil is ploughed to a depth of 12 to 14 inches, a sub-soil stirrer must follow the ordinary plough. Much more hand labour (hoeing) is required for sugar beet than for other root crops. This is performed in Germany by migratory labourers (women), who travel from Poland each spring to the beet-growing districts, and are content to work for very low wages. Draught oxen are peculiarly adapted for the machine hoeing of beet, which is grown in very narrow drill rows (12 to 18 inches wide), but the utilisation of cattle for this purpose in the United Kingdom can hardly be considered profitable owing to the small price which an old draught ox would realise when fattened. The total cost of cultivation of sugar beet is much in excess of the cost of cultivation of turnips or other root crop, and a yield of 15 tons of beet per acre at even as high a price as 18s. per ton should not induce farmers to abandon the cultivation of turnips or mangels in favour of sugar beet.

Though increasing very slightly at first, the percentage of sugar in beet decreases very considerably during the time the roots are stored before being treated in the factory. The loss due to the decrease in sugar content is much augmented owing to the fact that the substances arising from the decomposition of this sugar considerably increase the difficulties of the sugar extraction in the factory. German factories endeavour, therefore, to finish their season within twelve or fourteen weeks.

It should, moreover, be noticed that the Excise duty now levied on sugar affects only the imported article. Therefore, according to the present state of the law, if sugar were grown in these countries it would not be liable to duty; but there exists no guarantee that such exemption from duty would be afforded permanently to the cultivation of sugar-beet in the United Kingdom.

The high price of sugar which is at present current is largely due to a natural cause, i.e., the shortage of supply occasioned by the partial failure of last summer's Continental beet crop. The present price cannot therefore be accepted as the basis of calculations concerning the suitability of the sugar beet industry to Ireland.

It is realised that many benefits have resulted from the cultivation of beet in Germany and other Continental countries, the chief of these being the employment of a large agricultural population and a marked advance in agricultural methods in those districts where

beet is largely grown. The conditions prevailing there are, however, as is shown above, not directly comparable with those of this country.

Comparing the extents under the chief cereal crops in 1904 with those crops for 1903, we find a decrease of  
**The Irish** 6,771 acres, or 18·0 per cent. in wheat; a  
**Harvest of 1904.** decrease of 18,766 acres, or 1·7 per cent. in  
 oats; a decrease of 669 acres, or 0·4 per cent.

in barley; and a decrease of 636 acres, or 6·3 per cent. under rye. In green crops, potatoes decreased by 1,853 acres, or 0·3 per cent.; turnips decreased by 1,717 acres, or 0·6 per cent.; and mangel wurzel decreased by 252 acres, or 0·3 per cent. In other crops—flax decreased by 392 acres, or 0·9 per cent.; the area for hay from clover, sainfoin, and grasses under rotation increased by 4,489 acres, or 0·7 per cent.; and the area for hay from permanent pasture or grass not broken up in rotation increased by 31,506 acres, or 2·0 per cent. Compared with the average acreage for the 10 years 1894-1903, mangel wurzel and beet root showed an increase of 12,612 acres or 20·0 per cent.; clover, sainfoin, and grasses under rotation, an increase of 1,700, or 0·3

**Acreage under Crops.** per cent., and permanent pasture or grass not broken up in rotation an increase of 79,865 acres, or 5·2 per cent.; but each of the other chief crops exhibits a decrease in the extent devoted to it, the decrease in wheat being 14,613 acres, or 32·2 per cent., in oats, 73,718 acres, or 6·4 per cent., in barley, 8,886 acres, or 5·3 per cent., in rye, 2,268 acres, or 19·4 per cent., in potatoes, 49,193 acres, or 7·4 per cent., in turnips, 15,577 acres, or 5·2 per cent., in flax 13,792 acres, or 23·7 per cent. In 1903 the area returned for grass (not for hay) under rotation was 608,776 acres, and in 1904, 647,416 acres, being an increase of 38,640, or 6·3 per cent.; the area under grass (permanent pasture not for hay) was 9,988,945 acres in 1903, and 9,939,223 in 1904, being a decrease of 49,722 acres, or 0·5 per cent. Compared with the average acreage for the 10 years 1894-1903 grass under rotation (not for hay) showed an increase of 17,555 acres, or 2·8 per cent., and permanent pasture (not for hay) an increase of 98,159 acres, or 1·0 per cent.

As already stated, the acreage under potatoes in Ireland in 1904 was 618,540, as compared with 620,393 in the year 1903, showing

a decrease of 1,853 acres. The acreage under each of the principal varieties of potatoes planted in 1904, with the percentage to the total, is shown in the following statement:—

	Acrea	Per Cent.		Acrea,	Per Cent.
Champions, ... ..	379,368	61·3	British Queens, ...	3,143	4·9
Up-to-Date, .. ...	50,260	9·6	American Roses, ...	2,942	
Beauty of Bute, ...	43,567	7·0	Black Skerries, ...	2,573	
Flounders, ... ..	42,247	6·8	Bruces, ... ..	2,048	
Suttons or Sutton's Abundance.	27,580	4·5	Early Roses, ... ..	1,460	
Irish Whites, ... ..	18,617	3·0	Ardcairns or Ardcairn Beauties.	1,422	
Skerry Blues, ... ..	17,927	2·9	Gawkies, ... ..	1,250	
			Magnum Bonums, ...	1,219	
			Champion Skerries, ...	1,210	
			Elephants or White Elephants.	1,204	
			Main Crop, ... ..	1,076	
			All others, ... ..	10,517	

The main feature observable in the foregoing statement is that 61·3 per cent. of the acreage under the potato crop in Ireland consists of Champions, leaving only 38·7 per cent. for all other varieties—the percentage of some of these being so small as to be barely appreciable when put into figures.

The conditions affecting the harvest of 1904 were in marked contrast to those noted last year. The very wet weather which prevailed during the autumn of 1903, and continued into the spring of 1904, created particularly adverse conditions for the preparation of the land

#### The English Harvest of 1904.

and led to a very unfavourable seed time, to which many estimators attribute the low yields of grain ultimately realised. More or less drought in early summer was a further cause of deterioration in the crops; but the subsequent improvement in the weather of the year allowed all kinds of produce to be secured under exceptionally favourable circumstances. The short duration of the actual harvesting operations, in fact, was perhaps the most marked feature of the season, and formed a noteworthy contrast to the protracted harvest of 1903. Several estimators refer to the harvest of 1904 as one of the shortest in their respective districts, and one entailing but a small outlay for extra labour. The quality of all crops, moreover, appears to have been very superior to that of the preceding year.

Regarding the results of the harvest in Great Britain as a whole, the yields per acre of wheat, barley, beans, and hops were much below the average, those of potatoes, roots, and hay being considerably above, while oats and peas differed only fractionally from the average. The results in England and Scotland, however, were materially different as regards cereal crops. South of the Border all five crops proved deficient, three of them seriously so; north of the Border, on the other hand, none of the five crops were below the mean. In Wales, again, four of the cereals were above the average, beans only falling slightly below the ten years' mean. It should also be noted that in England the Eastern and East Midland counties fared very badly. Not only as regards grain crops, but also in respect of roots and hay, the yields were under the average; Lincoln especially and the adjoining counties showing, as a rule, the greatest deficiencies from the mean in all the crops enumerated.

The total estimated production of WHEAT was 36,880,246 bushels, a smaller amount than has been returned in any year, since the data was first collected.

**The Cereal  
Crops.**

The yield per acre, 26·82 bushels, which was 4·13 bushels below the average, has, moreover, touched a lower point on only three previous occasions, the lowest yield of any year in the crop records having been that of 1893, when it was 25·95 bushels.

The total production of BARLEY, like that of wheat, was the smallest of the last twenty years; and the estimated yield of 31 bushels per acre was 2·1 bushels below the average, but, nevertheless, it exceeded considerably the minimum average yield of 28·69 bushels per acre returned in 1893. The deficiency in England alone was 2·5 bushels per acre, Wales having three-quarters of a bushel over average, and Scotland exactly equalling the ten years' mean.

The total production of OATS proved to be very large, having been exceeded only in 1894, when 135,462,931 bushels were recorded, and in 1902. This large amount is, however, in the main attributable to the increased acreage, the yield per acre throughout Great Britain being only a tenth of a bushel above the mean. The English crop of this cereal, indeed, proved deficient by a quarter of a bushel, Wales having an increase of 1·74, and Scotland one of 0·11 bushels per acre.

BEANS were, on the whole, estimated as the worst of the cereal crops in Great Britain, the yield being 5·13 bushels below the mean. PEAS, practically negligible outside England, were rather more than half a bushel below the ten years' average.

The total production of POTATOES has only three times previously been exceeded, the greatest crop on record—

**Root Crops.** 3,743,203 tons—having been returned in 1884. England and Scotland both had, in

1904, a yield per acre largely above average, the former by 6 cwts., the latter by almost 30 cwts., while an average of over 7 tons per acre, as was secured in Scotland, has never previously been noted in any of the three divisions of Great Britain. Wales was not so fortunate, the 4·84 tons per acre there returned representing about 12 cwts. less than the mean.

The production of TURNIPS and SWEDES was heavy, being above the average by more than a ton in England, by  $1\frac{3}{4}$  tons in Wales, and by over  $2\frac{1}{2}$  tons in Scotland.

MANGOLDS were not quite so conspicuously good a crop as turnips, nevertheless they yielded practically half a ton per acre above the average. On the very small acreage in Scotland, however, they proved below the mean by over three quarters of a ton.

The HAY crop turned out to be substantially above the average, although it was not up to the level of 1903

**The Hay Crop.** either in total amount or yield per acre.

Relatively heavier returns were obtained in Scotland than in England, while the Welsh returns were also high. From clover and grasses under rotation a yield of nearly 1 cwt. per acre above the average was secured in England, and nearly  $1\frac{1}{2}$  cwts. in Scotland.

Of Hay from permanent grass the results reported show England as having nearly a cwt., Wales  $1\frac{3}{4}$  cwts., and Scotland 2 cwts. more than the mean.

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The Committee who provide prizes at the Royal Dublin Society's Winter Show have asked the Department to

**Barley Sowing.** issue the following recommendation to barley growers. The Department have much pleasure

in acceding to this request.

1. Barley should be sown as early as possible, subject to the land being in a fit condition to receive the seed. Care should be exercised to avoid sowing the seed in a cold, damp, and only partially prepared seed bed.

2. Without a fine seed bed, a good yield of barley cannot be expected. Great care should, therefore, be exercised to have the land made as clean and as fine as possible by the use of the harrow, grubber or cultivator, and if necessary a light roller to break the lumps.

3. Notwithstanding the importance of having barley sown very early, it would be wiser to wait in the event of there being a difficulty in getting the soil in condition.

4. The seed used should be sound and likely to germinate well. Great care should be taken to see that it is pure to type, being either narrow-eared or "Chevalier" type, or of the wide-eared or "Goldthorpe" type. A mixture of the narrow and wide-eared barleys greatly deteriorates the value of the crop.

The germination of the seed can be tested at the Department's Seed-testing Station for the sum of 3*d.* per sample. Full particulars of the station, together with envelopes for sending sample to the same, may be obtained, free of charge, from the Department.

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The Department have received frequent complaints from Brewers and Maltsters of the injury done to barley in the

**Barley Threshing.** process of threshing, arising from the fact that the drum of the threshing machine is set so close that many of the grains are clipped or broken. The presence of these injured grains greatly deteriorates the value of the barley for malting purposes. When farmers commence a day's threshing they should at the outset, and repeatedly during the day, carefully examine the grain. If any signs of injury are observed, the drum of the machine should be slightly opened. It is better that part of the beard should be left adhering to the grain than that any risk should be run of injuring the reputation and value of home-grown barley through having broken and clipped grains.

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According to a recent report of the German Consul in Paris, published in the *Board of Trade Journal*,

**Agricultural  
Exhibitions at  
Bordeaux, Lyons,  
and Rouen.**

Agricultural Exhibitions are to be held in Bordeaux (27th May to 4th June), Lyons (3rd to 11th June), and Rouen (7th to 25th June), at which foreign machines and implements might be shown with advantage.

For the Bordeaux Exhibition, machines and implements for vine culture, wine preparation, and dairying, would



be especially suitable; for Lyons and Rouen, harvesting and dairying machines, the introduction of which would not entail very great expense.

Whilst the Exhibitions are mainly limited to French products, foreign machines, implements, &c., are admitted, provided they are introduced by representatives dwelling in France.

For the exhibition of foreign goods, application should be made on special forms, obtainable at the Ministry of Agriculture, 78, Rue de Varenne, Paris, the latest dates for the receipt of such being 20th April for Bordeaux; 3rd May for Lyons, and 17th May, for Rouen.

Free carriage for all exhibits has been granted by the French railway authorities.

The report adds that exhibits of motor machinery and implements, which could be utilised for agricultural purposes without revolutionising existing conditions, should have a specially favourable reception, as French farmers are said to be much interested in them.

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<p>The special technical school for the book-printing trades at Stuttgart was founded in 1902 through the agency of the Stuttgart Printers' Association. It is intended for the instruction of apprentices employed in the printing branches of the Stuttgart book-trade, Stuttgart being, after Leipsic and Berlin, one of</p>	<p>the great German book-trade centres.</p>
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The instruction is divided into two courses, for type-setting and for printing, each lasting two years, and is given on two evenings of the week from 6 to 8, or 7 to 9.

Entrance to the school is limited to apprentices employed by printing firms which have contributed to defray the expenses of the school; for these, however, it is obligatory.

The number of pupils in the first year amounted already to 90, 48 in the type-setting course and 42 in the printing class, a sure sign of the necessity of the foundation of such a school.

The fees are of course insufficient to meet the expenses of the school, the former being 50*l.* and the latter about 500*l.* per annum; the deficit is covered by the State, the town, and the Printers' Association.

*First Class.*

History and importance of printing.

Type material. Typographical calculations.

**General Plan  
of the  
Instruction.**

Art of composing and distributing. The rules of composing.

Sizes of paper and type.

Setting type for newspapers and books, novels, catalogues, &c., and easy tabular work.

Making calculations on manuscript.

Justifying the formes.

Setting up simple titles, spacing out the lines thereof, and modern forms of title or headings.

Simple commercial work.

*Second Class.*

Short revision of the subjects dealt with in the first class.

Setting up mathematical matter.

Setting up circulars and prospectuses.

Book caps.

Various kinds of difficult commercial work.

Printing for public companies, societies, &c.

Setting up genealogical trees.

Setting up placards.

Receipts, bills of exchange, shares, diplomas.

Tinted plate blocks.

In the first class of the printing department, it is sought to train the students mainly in the making ready of the forme and to render them familiar with the platen-press.

The students in the second class, after the several parts of the power-press have been thoroughly explained, are employed in the printing of type and block-formes, cards and like miscellaneous work, illustrations, &c., and in this work explanation is continually given as to how advantage can be taken of repeated matter and on other parts of the practical work. By the production of a four-colour print and of various styles of raised printing, opportunity is offered the students of also receiving training in these departments.

Lectures on the theoretical part of the work supplement what is learnt in the practical part.

In the composing room, the principal object kept in view in the training of the students is to introduce them to those departments of the art of composing to which less attention is paid in the

instruction printing offices. After introduction to setting up type for books, catalogues, notices, and tabular work, the students pass on to setting up type for cards and like miscellaneous work, and in the last case, in addition to tasteful arrangement, attention is paid to obtaining the greatest possible simplicity in executing the work.

The object aimed at in the school is not to produce exhibition work, but to select such work as will be actually understood by the students and can be carried out by them independently.

The pieces of work to be done are technically explained in the theoretical instruction and must be sketched afterwards by the students; in this manner, all the members of the particular class are enabled to obtain a knowledge of the printing work carried out. Similarly the theoretical lectures given are to be written down in abstract and form the basis for the repetition work done from time to time. The specimen sheets from the type-foundries, the supplements given with the trade journals, some volumes of the "Pattern Exchange" and "Goebel's Graphic Art," and also the manuscripts and printed matter put at the disposition of the school by several firms provide splendid material for instruction.

The gilding school at Glauchau is a private school attached to a book-gilding establishment. It is open to all bookbinders who have completed their term of apprenticeship. The course of instruction lasts from two to three months

**The Gilding  
School at  
Glauchau.**

and costs 25s. per month. The raw materials, such as gold, leather and linen, are bought by the pupils themselves, and supplied at cost price; this entails a further expenditure of about 30s. per month.

1. Hand-gilding:—

- (a) Tooling backs with the simplest up to the most difficult patterns.
- (b) Tooling titles.
- (c) Decorative tooling.

2. Leather coverings with hand-gilding:—

- (a) Tooling backs.
- (b) Decorative tooling.

3. Gold-blocking by press:—

- (a) Gold, black, blind or antique and relief work.
- (b) Bronze, colour and rainbow work.

4. Coloured and gold-ornamented edges, tooled and painted gilt edges.

5. Marbling in all imaginary patterns.

6. Regular bookbinding:—

(a) Half and whole calf-binding.

(b) Commercial books.

7. Cutting leather.

8. Ruling the simplest to the most complicated rulings on ruling machines.

The apparatus for use in instruction has recently been very largely increased and the latest novelties in modern tools, stamps, rolls, fillets, and letters are provided. The number of hand tools amounts to about 990. For the six gold-blocking presses, in addition to numerous blocks, there are about 260 sets of different letters available for use.

EXTRACT from the ANNUAL REPORT of the *City and Guilds of London Institute* for the SESSION 1903-1904.

“Considerable progress has been made during the past year in the organization and development of Technical Instruction in Evening Schools in Ireland. The figures for Ireland . . . show a general increase on those contained in last year’s report. The number of towns where classes have been held, or where examinations have been conducted, is 25 this year, against 15 last year, showing the wider interest now taken in the teaching of Technology. The number of registered classes has increased from 160 to 163, of students from 2,382 to 2,499, of candidates examined from 544 to 722, and of passes from 269 to 362, whilst the number of prizes gained by Irish students is 13, against 9 last year.

“Special arrangements have been made with the Department of Agriculture and Technical Instruction for the approval by the Institute of the qualifications of teachers of classes in Technology and of Instructors of normal classes in Manual Training.”

## LOCAL SCIENCE AND ART EXAMINATIONS (IRELAND).

May and June, 1904.

## Summaries of Results.

Year.	Number Examined.	Number of Passes.	Number of Failures.	Percentage of Passes.
1904	5,922	3,344	2,578	56.47
1903	4,894	2,662	2,232	54.39
1902	4,380	2,320	2,061	52.94
1901	4,013	2,184	1,829	54.42

(The corresponding figures for the Examinations of 1902 are given in Old Style).

—		Number Examined.	Number of Passes.	Number of Failures.	Percentage of Passes.
Science Examinations.	Day.	121	55	66	45.45
		16	9	7	56.25
	Evening.	1,656	1,016	640	61.35
		1,341	815	526	60.77
		1,777	1,071	706	60.27
		1,357	824	533	60.72
Art Examinations.	Day.	593	337	256	56.83
		480	169	311	35.20
	Evening.	3,552	1,936	1,616	54.50
		3,057	1,669	1,388	54.59
		4,145	2,273	1,872	54.84
		3,537	1,838	1,699	51.96

For the purposes of comparison the figures of the whole of the Examinations held by the Board of Education, South Kensington, are appended.

Science (Day and Evening).	1904	77,277	50,516	26,761	65.87
	1903	76,013	49,308	26,705	64.86
	1902	80,651	48,525	32,126	60.16
	1901	99,790	65,913	33,877	66.05
Art (Day and Evening).	1904	88,081	53,340	34,741	60.56
	1903	89,992	52,445	37,547	58.27
	1902	94,780	56,099	38,681	59.18
	1901	111,555	59,951	51,704	53.72
Totals.	1904	165,358	103,856	61,502	62.81
	1903	166,005	101,753	64,252	61.29
	1902	175,431	104,624	70,807	59.63
	1901	211,745	125,164	86,581	59.11

## SCIENCE EXAMINATIONS (IRELAND)—EVENING.

SUBJECT.	Stage 1.			Stage 2.			Stage 3.*			Honours.		
	Number Examined.	1st Class.	2nd Class.	Number Examined.	1st Class.	2nd Class.	Number Examined.	1st Class.	2nd Class.	Number Examined.	1st Class.	2nd Class.
I. Practical Plane and Solid Geometry.	64 50	24 14	19 17	13 7	2 1	5 3	1 -	- -	1 -	- -	- -	- -
II. Machine Construction and Drawing.	143 87	29 28	46 16	39 26	2 2	14 18	8 2	1 -	2 -	2 1	- -	- -
III. Building Construction.	140 122	61 45	51 55	60 27	24 4	27 14	11 4	- 1	9 -	1 -	- -	- -
IV. Naval Architecture.	11 19	1 8	7 9	5 10	2 3	2 7	6 2	- 1	3 -	1 2	- -	- 1
V. Practical Mathematics.	37 25	7 2	11 7	19 1	1 -	5 -	8 -	- -	2 -	- -	- -	- -
VIA. Theoretical Mechanics (Solids).	14 30	6 3	6 6	15 2	- -	9 1	1 -	- -	1 -	- -	- -	- -
VII. Theoretical Mechanics (Fluids).	11 9	3 3	2 5	8 4	- -	2 2	1 -	- -	- -	- -	- -	- -
VII. Applied Mechanics.	57 44	10 9	16 13	23 17	5 1	11 10	7 1	- -	1 -	- -	- -	- -
VIII. Sound, Light, and Heat.	39 38	11 12	18 16	- -	- -	- -	- -	- -	- -	- -	- -	- -
VIIIA. Sound.	- -	- -	- -	4 4	- -	3 2	1 -	- -	1 -	- -	- -	- -
VIIIB. Light.	- -	- -	- -	3 3	- 1	1 2	- -	- -	- -	- -	- -	- -
VIIIC. Heat.	- -	- -	- -	5 4	- 1	3 3	1 1	- -	- -	- -	- -	- -
IX. Magnetism and Electricity.	134 140	17 56	44 40	38 14	5 3	16 6	2 1	- 1	- -	- -	- -	- -
X. Inorganic Chemistry.	144 100	51 25	57 33	42 34	3 6	21 11	1 1	1 -	- -	- -	- -	- -
XI. Inorganic Chemistry (Practical).	73 65	16 29	28 26	35 23	10 5	14 10	2 2	- -	1 -	- -	- -	- -

\* Formerly known as Honours, Part I.

SCIENCE EXAMINATIONS (IRELAND)—EVENING—*continued.*

SUBJECT.	Stage 1.			Stage 2.			Stage 3.			Honours.		
	Number Examined.	1st Class.	2nd Class.	Number Examined.	1st Class.	2nd Class.	Number Examined.	1st Class.	2nd Class.	Number Examined.	1st Class.	2nd Class.
XI. Organic Chemistry, . . . {	15	1	5	1	-	1	-	-	-	}	-	-
	13	2	2	2	-	1	-	-	-		-	-
XIP. Organic Chemistry (Practical), {	10	4	3	-	-	-	-	-	-	}	-	-
	6	2	3	-	-	-	-	-	-		-	-
XII. Geology, . . . {	2	1	1	1	-	-	-	-	-	}	-	-
	6	4	2	2	-	-	-	-	-		-	-
XIV. Human Physiology, . . {	8	5	1	4	-	2	-	-	-	}	-	-
	30	12	15	-	-	-	-	-	-		-	-
XVI. Zoology, . . . {	1	1	-	-	-	-	-	-	-	}	-	-
	-	-	-	-	-	-	-	-	-		-	-
XVII. Botany, . . . {	9	1	4	3	-	3	-	-	-	}	-	-
	9	1	3	1	-	-	-	-	-		-	-
XIX. Metallurgy, . . . {	-	-	-	1	-	1	-	-	-	}	-	-
	-	-	-	1	-	1	-	-	-		-	-
XX. Navigation, . . . {	2	2	-	3	2	-	-	-	-	}	-	-
	-	-	-	-	-	-	-	-	-		-	-
XXII. Steam, . . . {	51	10	29	19	2	7	5	-	-	}	-	-
	33	7	13	13	-	12	2	-	-		-	-
XXIII. Physiography, . . {	3	1	1	4	3	1	-	-	-	}	-	-
	7	1	4	-	-	-	1	-	-		-	-
Do. (Section 1 only), {	21	12*	-	-	-	-	-	-	-	}	-	-
	41	15*	-	-	-	-	-	-	-		-	-
XXIV. Agricultural Science and Rural Economy, {	-	-	-	-	-	-	-	-	-	}	-	-
	2	1	1	-	-	-	-	-	-		-	-
XXV. Hygiene, . . . {	24	7	11	6	1	3	1	-	1	}	-	-
	31	9	21	1	-	1	-	-	-		-	-
Do. (Section 1 only), . {	-	-	-	-	-	-	-	-	-	}	-	-
	28	19*	-	-	-	-	-	-	-		-	-
Totals, . . . {	1,013	280	380	351	62	161	52	2	22	4	-	-
	935	273	307	196	27	104	17	3	-	3	-	1

\* Passes: only one class of success.

SCIENCE EXAMINATIONS (IRELAND)—EVENING—*continued.*

SUBJECT.		Stages 1 to 7.			Honours.			
		Number Ex- amined.	1st Class.	2nd Class.	Number Ex- amined.	1st Class.	2nd Class.	
V. Mathematics.	Division I.	1. {	162	26	56	3	1	1
			126	29	31			
		2. {	47	5	27			
			40	1	19			
		3. {	19	11	8			
			17	3	13			
	Division II.	5. {	4	1	2	-	-	-
			5	-	3			
		6. {	1	-	1			
			-	-	-			
Totals,		{	233	43	94	3	1	1
			188	33	66	2	1	-

\* The two Candidates presented themselves for examination in Honours, Part I

## SCIENCE EXAMINATIONS (IRELAND)—DAY.

SUBJECT.	Stage 1.			Stage 2.		
	Number Ex- amined.	1st Class.	2nd Class.	Number Ex- amined.	1st Class.	2nd Class.
I. Practical Plane and Solid Geometry, {	1	1	-	1	1	-
VIII. Sound, Light, and Heat, . . . {	3	1	2	-	-	-
IX. Magnetism and Electricity, . . . {	5	2	1	-	-	-
X. Inorganic Chemistry, . . . {	3	-	1	2	1	1
XI. Inorganic Chemistry (Practical), . . . {	1	-	-	-	-	-
XII. Inorganic Chemistry (Practical), . . . {	2	1	1	-	-	-
XIII. Human Physiology, . . . {	9	5	2	-	-	-
XXIII. Physiography, . . . {	-	-	-	1	1	-
Do., (Section I. only), . . . {	1	-	1	-	-	-
XXIV. Agricultural Science and Rural Economy, . . . {	22	4 <sup>a</sup>	-	-	-	-
XXV. Hygiene, . . . {	9	5 <sup>b</sup>	-	-	-	-
Do., (Section I. only), . . . {	-	-	-	7	-	3
Totals, . . . {	9	1	5	2	-	2
	3	-	-	-	-	-
	52	14	10	13	3	6
	16	6	3	-	-	-

\* Passes: only one class of success.



SCIENCE EXAMINATIONS (IRELAND)—DAY—*continued.*

SUBJECT.	Stages 1 to 7.		
	Number Examined.	1st Class.	2nd Class.
V. Mathematics, Division I.,	46	4	10
	-	-	-
	9	1	6
	-	-	-
	1	-	1
Totals, . . .	-	-	-
	56	5	17

## ART EXAMINATIONS (IRELAND)—EVENING.

SUBJECT.	Number Examined.	1st Class.	2nd Class.
Freehand Drawing in Outline, . . .	936	144	368
	790	134	288
Drawing in Light and Shade from a Cast, . .	298	29	131
	264	51	115
Model Drawing, . . . . .	566	124	206
	476	68	185
Drawing on the Blackboard, . . . . .	468	115	129
	508	152	165
Geometrical Drawing, . . . . .	371	56	107
	292	55	83
Perspective, . . . . .	66	8	28
	61	8	32
Drawing of Common Objects from Memory, .	42	4	8
	-	-	-
Memory Drawing of Plant Form, . . . . .	121	15	79
	142	8	40
Drawing from the Antique, . . . . .	36	14	18
	34	10	18

ART EXAMINATIONS (IRELAND)—EVENING—*continued.*

SUBJECT.	Number Ex- amined.	1st Class.	2nd Class.
Drawing the Antique from Memory, . . . . .	15	4	2
	7	1	3
Drawing from Life, . . . . .	35	4	5
	22	4	4
Anatomy, . . . . .	23	1	12
	24	2	8
Painting Ornament, . . . . .	23	—	15
	19	2	8
Painting from Still Life, . . . . .	41	10	24
	34	5	16
Principles of Ornament, . . . . .	66	2	23
	47	3	21
Historic Ornament, . . . . .	14	2	7
	22	1	9
Architecture, . . . . .	11	2	1
	5	2	—
Architectural Design, . . . . .	3	—	—
	4	—	1
Design, Stage 1, . . . . .	304	42	167
	208	36	93
Do., Stage 2, . . . . .	50	1	9
	42	5	13
Do., Honours, . . . . .	5	—	1
	4	—	1
Modelling the Head from Life, . . . . .	6	3	—
	11	3	2
Modelling from Life, . . . . .	11	1	1
	4	1	—
Modelling from the Antique, . . . . .	32	1	7
	28	2	4
Modelling Design, Stage 2, . . . . .	18	3	3
	9	3	4
Do., Honours, . . . . .	1	—	—
	—	—	—
Totals, . . . . .	3,552	585	1,351
	3,057	556	1,113

## ART EXAMINATIONS (IRELAND)—DAY.

SUBJECT.	Number Ex- amined.	1st Class.	2nd Class.
Freehand Drawing in Outline, . . . . .	220 196	28 26	98 38
Drawing in Light and Shade from a Cast, . . . . .	72 76	4 1	25 13
Model Drawing, . . . . .	141 131	53 19	46 45
Geometrical Drawing, . . . . .	138 56	20 5	49 16
Perspective, . . . . .	22 21	2 -	12 6
Totals, . . . . .	593 480	107 51	230 118

## EXAMINATIONS IN SUBJECTS OF TECHNOLOGY (IRELAND), 1904.

YEAR.	Number of Registered Classes.	Number of Students attending Classes.	Number of Candidates Examined.	Number of Candidates Passed.	Number of Prizes.
1904	163	2,499	722	362	13
1903	160	2,382	544	269	9
1902	75	1,549	395	177	3
1901	61	789	289	105	-

(The corresponding figures for the Examinations of 1903 are given in Old Style.)

No. of School	PLACE.	No. of Regis- tered Classes.	No. of Students attending Classes.	No. of Candi- dates Ex- amined.	No. of Candi- dates Passed.	No. of Prizes.
6038	Armagh Municipal Technical School.	5 -	78 -	2 -	1 -	- -
6384	Ballina Technical School, . . . . .	1 2	14 20	- -	- -	- -
6358	Ballymena Municipal Technical School.	2 2	17 22	7 5	2 3	- -
6227	Belfast—Municipal Technical Institute.	27 49	540 1,274	242 214	153 121	6 8
6248	Blackrock Municipal Technical School.	5 7	99 78	- 8	- 4	- -

EXAMINATIONS IN SUBJECTS OF TECHNOLOGY (IRELAND), 1904—*con.**(The corresponding figures for the Examinations of 1903 are given in Old Style)*

No. of School	PLACE.	No. of Registered Classes.	No. of Students attending Classes.	No. of Candidates Examined.	No. of Candidates Passed.	No. of Prizes.
6457	Bray Technical School, . . {	3	56	-	5	-
6235	Coleraine Technical School, . {	-	-	6	3	-
6003	Cork — Crawford Municipal Technical Institute. {	12 7	114 91	57 36	39 14	5 1
6024	Cork—St. Vincent's Convent {	-	35	-	-	-
6416	Drogheda Municipal Technical School. {	4	77	13	-	-
6010	Dublin—City of Dublin Technical School. {	37 50	581 400	199 107	82 88	-
6415	Dundalk Municipal Technical School. {	6	112	32	-	-
6581	Dungannon Municipal Technical School. {	-	-	1	1	-
6066	Galway — City of Galway Technical Institute. {	5 4	62 58	15 1	8 1	-
6607	Kilkenny City Technical School. {	2	52	8	2	-
6163	Kingstown Municipal Technical School. {	5 10	88 100	17 11	9 7	-
6043	Kinsale Technical School, . {	-	-	5	3	-
6232	Larne Municipal Technical School. {	2	25	2	2	-
6039	Limerick Municipal Science, Art, and Technical Schools. {	16 13	122 157	38 15	15 4	-
6037	Londonderry Municipal Technical School. {	10 9	71 66	8 6	7	-
6133	Lurgan — Convent of Our Lady of Mercy Technical School. {	1	13	14	5	-
6367	Lurgan Municipal Technical School. {	2 3	54 33	11 6	4 2	-
6544	Newry Municipal Technical School. {	10	213	21	11	-
6645	Newtownards Technical School. {	-	-	1	1	-
6041	Ringsend—Pembroke Technical School. {	7 2	106 32	12 31	7 16	-
6571	Tralee — Central Technical School. {	1 1	5 8	4 4	1 3	-
6508	Tullamore Technical School, {	-	-	2 4	2 3	2 -
6118	Waterford — Christian Brothers' Schools, Mount Sion. {	-	-	4	2	-
Total, . . {		163 160	2,499 2,382	722 544	362 269	13 9

## PRIZES AND MEDALS GAINED BY IRISH STUDENTS.

## BELFAST MUNICIPAL TECHNICAL INSTITUTE.

Name.	Subject.	Grade.	Place taken at Examination.	Prize.
Couser, Samuel R.	Lithography.	Honours.	First.	£2 (Cordwainers) and Silver Medal.
Gibson, William.	Flax Spinning.	Honours.	First.	£3 (Clothworkers) and Silver Medal.
Mann, Robert.	Plumbers' Work.	Ordinary.	Second.	£2 and Bronze Medal.
Martin, David.	Flax Spinning.	Ordinary.	First.	£2 (Clothworkers) and Silver Medal.
Meikle, James.	Bread Making.	Honours.	First.	£2 (Salters) and Silver Medal.
Taygart, Samuel Hemphill.	Flax Spinning.	Ordinary.	Second.	£2 (Clothworkers) and Bronze Medal.

## CORK—CRAWFORD MUNICIPAL TECHNICAL INSTITUTE.

Name.	Subject.	Grade.	Place taken at Examination.	Prize.
Brown, John G.	Milling (Flour Manufacture).	Ordinary.	Second.	£2 (Pewterers) and Bronze Medal.
Colthurst, Henry Williams.	Telegraphy.	Honours.	Second.	£3 (Pewterers) and Bronze Medal.
FitzGibbon, Daniel.	Painters' and Decorators' Work.	Ordinary.	Second.	£2 and Bronze Medal.
Reen, James Ptk.	Mechanical Engineering (Workshop Practice).	Honours.	Second.	£3 and Bronze Medal.
Reen, James Ptk.	Rail Carriage Building).	Honours.	First.	£3 (Merchant Tailors) and Silver Medal.

## TULLAMORE TECHNICAL SCHOOL.

Name.	Subject.	Grade.	Place taken at Examination.	Prize.
Smith, George Hy.	Carpentry and Joinery.	Honours.	Third.	£2 (Carpenters) and Bronze Medal.
Smith, George Hy.	Masonry.	Honours.	First.	£3 (Cordwainers) and Silver Medal.

## STATISTICAL TABLES.

## FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast.				East Coast.			
	1904.		1903.		1901.		1903.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	.	.	12	23	14	32
Soles, . . . . .	.	.	1	3	52	237	30	216
Turbot, . . . . .	.	.	.	.	30	187	25	171
Total Prime Fish, . . . . .	.	.	1	3	94	447	69	419
Cod, . . . . .	311	132	516	242	1,505	1,234	1,010	1,173
Conger Eel, . . . . .	4	4	10	9	190	106	310	236
Haddock, . . . . .	817	341	749	368	278	250	293	398
Hake, . . . . .	.	.	.	.	262	412	292	401
Herring, . . . . .	43,392	10,101	29,101	11,294	4,234	1,546	10,450	2,225
Ling, . . . . .	.	.	.	.	258	247	57	42
Mackerel, . . . . .	.	.	16	3	.	.	.	.
Plaice, . . . . .	.	.	7	9	684	852	259	419
Ray or Skate, . . . . .	.	.	11	4	231	69	322	94
Sprats, . . . . .	.	.	.	.	.	.	13	14
Whiting, . . . . .	.	.	422	81	707	546	1,171	728
All other except Shell Fish, . . . . .	115	32	.	.	2,065	1,120	1,665	714
Total, . . . . .	44,639	10,610	30,833	12,013	10,508	6,859	15,941	6,863
SHELL FISH :—	No.		No.		No.		No.	
Crabs, . . . . .	.	.	.	.	590	2	215	1
Lobsters, . . . . .	.	.	.	.	1,092	47	1,233	47
Mussels, . . . . .	Cwts.		Cwts.		Cwts.		Cwts.	
Oysters, . . . . .	No.		No.		No.		No.	
Other Shell Fish, . . . . .	Cwts.		Cwts.		Cwts.		Cwts.	
Total, . . . . .	.	.	.	.	.	224	.	163
Total Value of Fish landed, . . . . .	.	10,610	.	12,013	.	7,083	.	7,026

NOTE—The above figures are subject to

## IRELAND.

as landed on the IRISH COASTS during the month of **December, 1904**, as corresponding period in 1903.

South Coast.				West Coast.				Total.			
1904.		1903.		1904.		1903.		1904.		1903.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
.	.	.	.	.	.	.	.	12	23	14	32
24	104	25	92	45	133	49	154	121	474	105	465
1	4	13	74	19	92	23	120	49	283	61	365
25	108	38	166	63	225	72	274	182	780	180	862
13	25	15	24	116	49	128	60	1,950	1,438	1,669	1,499
.	.	.	.	26	9	22	6	220	119	372	251
2	2	.	.	798	314	532	254	1,895	937	1,574	1,020
14	17	22	16	15	6	71	26	291	435	385	443
1,720	483	503	191	1,180	202	1,086	411	50,526	12,422	41,140	14,121
3	4	.	.	100	34	42	20	361	285	99	62
1,614	403	4,093	2,212	1,812	737	10,454	5,111	3,426	1,140	14,563	7,325
134	142	209	171	88	70	110	83	906	1,064	585	682
.	.	1	1	41	15	30	7	272	84	364	106
32	10	649	88	.	.	3	3	32	10	665	105
331	114	138	49	640	321	1,016	403	1,681	981	2,747	1,261
134	70	106	50	226	120	82	64	2,640	1,342	1,853	828
4,030	1,376	5,774	2,968	5,105	2,192	13,648	6,722	64,282	21,037	66,196	28,666
No.		No.		No.		No.		No.		No.	
.	.	60	3	200	1	.	.	790	3	375	4
18	1	.	.	962	35	1,330	44	2,062	83	2,663	91
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
.		.		630	50	88	10	1,140	101	1,741	56
No.		No.		No.		No.		No.		No.	
6,673	13	2	1	53,738	65	360,707	666	70,059	120	360,761	691
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
375	67	842	43	804	173	815	146	1,361	322	1,263	234
.	81	.	47	.	324	.	866	.	629	.	1,076
.	1,457	.	3,015	.	2,516	.	7,588	.	21,666	.	29,642

correction in the Annual Returns



## FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned  
compared with the

	North Coast				East Coast.			
	1905.		1904.		1905.		1904.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	.	.	16	33	12	46
Soles, . . . . .	.	.	.	.	28	130	28	193
Turbot, . . . . .	.	.	.	.	32	203	18	103
Total Prime Fish,	.	.	.	.	76	366	58	342
Cod, . . . . .	244	85	358	179	1,619	1,105	1,713	1,348
Conger Eel, . . . . .	.	.	1	1	178	104	417	285
Haddock, . . . . .	422	239	643	338	175	181	340	406
Hake, . . . . .	.	.	.	.	222	368	352	462
Herrings, . . . . .	5,755	1,808	9,754	2,671	16	14	.	.
Ling, . . . . .	.	.	.	.	341	347	111	67
Mackerel, . . . . .	.	.	.	.	.	.	.	.
Plaice, . . . . .	4	3	2	3	449	583	228	323
Ray or Skate, . . . . .	2	1	2	1	234	106	400	139
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	34	30	.	.	631	452	1,353	766
All other except Shell Fish,	43	21	5	2	1,060	601	2,293	1,027
Total,	6,504	2,187	10,765	3,195	5,001	4,287	7,265	5,164
SHELL FISH:—	No.		No.		No.		No.	
Crabs, . . . . .	.	.	.	.	290	1	446	12
Lobsters, . . . . .	.	.	.	.	1,084	52	820	27
Mussels, . . . . .	Cwts.	.	Cwts.	.	Cwts.	73	Cwts.	33
Oysters, . . . . .	No.	.	No.	.	No.	75	No.	27
Other Shell Fish,	Cwts.	.	Cwts.	.	Cwts.	66	Cwts.	51
Total,	12	2	.	.	169	.	122	160
Total Value of Fish landed,	.	2,189	.	3,195	.	4,554	.	5,314

NOTE.—The above figures are subject to

## IRELAND.

as landed on the IRISH COASTS during the month of January, 1905, as corresponding period in 1904.

South Coast.				West Coast.				Total.			
1905.		1904.		1905.		1904.		1905.		1904.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
2	8	.	.	.	.	.	.	18	41	12	46
12	52	4	14	79	352	47	160	119	534	79	367
.	.	.	.	19	104	15	80	51	307	33	183
14	60	4	14	98	436	62	240	188	882	124	596
32	38	32	50	292	129	629	260	2,187	1,417	2,732	1,837
.	.	.	.	19	8	71	29	197	112	489	315
8	6	14	5	577	327	751	311	1,182	763	1,748	1,059
.	.	.	.	9	3	123	48	231	371	475	510
1,197	313	765	253	496	142	951	325	7,464	2,277	11,470	3,249
3	3	.	.	102	52	459	161	446	402	570	228
214	48	6	2	1,818	818	145	68	2,082	866	151	70
101	91	76	50	372	336	240	180	926	1,013	546	556
.	.	.	.	75	16	81	20	311	123	483	160
31	8	18	3	.	.	.	.	31	8	18	3
163	61	281	118	713	336	1,212	487	1,541	879	2,846	1,371
79	65	27	22	150	145	39	32	1,332	832	2,364	1,083
1,842	693	1,223	517	4,721	2,768	4,763	2,161	18,068	9,935	24,016	11,087
No.		No.		No.		No.		No.		No.	
.	.	3	1	.	.	.	.	290	1	449	13
48	3	66	4	582	24	1,090	36	1,714	79	1,886	67
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
.	.	.	.	538	41	282	28	1,287	117	670	61
No.		No.		No.		No.		No.		No.	
6,720	14	4,800	13	22,987	27	83,634	98	61,018	116	100,184	138
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
355	54	347	48	1,100	200	956	182	1,636	322	1,425	281
.	71	.	66	.	295	.	344	.	635	.	560
.	764	.	583	.	3,063	.	2,505	.	10,670	.	11,597

correction in the Annual Returns.

## FISHERY STATISTICS

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as compared with the

—	North Coast.				East Coast.			
	1905.		1904.		1905.		1904.	
	Quan- tity.	Value.	Quan- tity.	Value	Quan- tity.	Value.	Quan- tity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	.	.	20	28	9	47
Soles, . . . . .	.	.	.	.	17	49	27	199
Turbot, . . . . .	.	.	.	.	30	178	17	153
Total Prime Fish, . . . . .	.	.	.	.	67	253	53	399
Cod, . . . . .	62	32	3	4	2,308	1,539	2,644	2,158
Conger Eel, . . . . .	2	2	.	.	418	215	433	288
Haddock, . . . . .	147	75	443	226	430	429	354	458
Hake, . . . . .	.	.	.	.	473	785	527	548
Herrings, . . . . .	1,111	285	2,383	877	.	.	.	.
Ling, . . . . .	3	3	.	.	705	705	107	70
Mackerel, . . . . .	25	10	.	.	.	.	.	.
Plaice, . . . . .	1	1	2	2	781	1,026	546	533
Ray or Skate, . . . . .	17	6	.	.	485	444	460	173
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	32	42	4	1	588	513	1,297	856
All other except Shell Fish, . . . . .	1	1	213	99	1,207	676	1,726	913
Total, . . . . .	1,391	457	3,048	1,209	7,460	6,585	8,147	6,396
SHELL FISH :	No.		No.		No.		No.	
Crabs, . . . . .	.	.	.	.	460	2	160	1
Lobsters, . . . . .	.	.	.	.	1,193	57	1,192	56
Mussels, . . . . .	Cwt.		Cwts.		Cwts.		Cwts.	
	.	.	.	.	675	74	480	49
Oysters, . . . . .	No.		No.		No.		No.	
	.	.	.	.	26,871	67	8,300	30
Other Shell Fish, . . . . .	Cwt.		Cwts.		Cwts.		Cwts.	
	18	3	.	.	387	136	169	62
Total, . . . . .	.	3	.	.	.	336	.	198
Total Value of Fish landed, . . . . .	.	460	.	1,209	.	6,921	.	6,594

NOTE—The above figures are subject to

## IRELAND.

landed on the IRISH COASTS during the Month of **February**, 1905, as corresponding period in 1904.

South Coast.				West Coast.				Total.			
1905.		1904.		1905.		1904.		1905.		1904.	
Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	wts.	£	Cwts.	£
1	2	.	.	8	9	.	.	29	37	9	47
26	124	8	34	168	1,040	66	265	211	1,213	91	498
.	.	1	2	15	67	19	98	45	235	37	253
27	126	9	36	191	1,106	75	363	285	1,485	137	798
18	25	21	23	249	126	1,249	518	2,625	1,722	3,917	2,703
.	.	.	.	67	26	71	30	487	243	501	318
6	7	1	1	616	290	778	395	1,199	801	1,576	1,080
.	.	.	.	6	4	23	8	479	789	550	556
1,293	295	591	179	834	220	224	57	3,239	800	3,138	1,113
16	19	.	.	291	142	279	120	1,015	869	386	190
712	243	.	.	830	326	.	.	1,567	579	.	.
223	184	130	86	599	591	800	617	1,604	1,802	1,478	1,238
3	1	.	.	130	38	85	25	635	489	545	198
18	5	.	.	.	.	.	.	18	5	.	.
44	15	253	124	577	419	2,010	952	1,241	989	3,564	1,933
107	65	74	44	176	170	86	63	1,491	912	2,099	1,125
2,467	985	1,019	463	4,506	3,458	5,680	3,154	15,884	11,485	17,894	11,252
No.	.	No.	.	No.	.	No.	.	No.	2	No.	1
190	11	42	3	522	24	912	41	1,910	92	2,146	100
Cwts.	.	Cwts.	.	Cwts.	41	Cwts.	22	Cwts.	115	Cwts.	71
No.	14	No.	4	No.	75	No.	34	No.	156	No.	68
Cwts.	50	Cwts.	38	Cwts.	194	Cwts.	170	Cwts.	383	Cwts.	270
.	75	.	45	.	334	.	267	.	748	.	510
.	1,060	.	538	.	3,792	.	3,421	.	12,233	.	11,762

correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Two Months ended 28th February, 1905, compared with the corresponding Periods of the Year 1904.

	February.		Two Months ended February.	
	1905.	1904.	1905.	1904.
	QUANTITY.			
	Cwts.	Cwts.	Cwts.	Cwts.
Brill, .....	2,224	2,294	4,399	4,730
Soles, .....	5,232	4,026	10,228	8,553
Turbot, .....	5,273	5,462	11,060	11,583
Other Prime Fish, .....	—	—	—	—
Total Prime Fish, ..	12,729	11,782	25,685	24,866
Bream, .....	1,814	—	5,017	—
Catfish, .....	2,471	2,072	3,639	3,145
Coalfish, .....	7,340	—	12,371	—
Cod, .....	129,021	124,073	206,887	224,651
Conger Eels, .....	5,833	3,506	9,122	6,656
Dabs, .....	8,641	9,830	15,949	18,865
Dogfish, .....	1,802	—	4,949	—
Dory, .....	231	—	627	—
Gurnards, .....	8,196	7,568	14,644	15,405
Haddock, .....	149,691	176,390	286,216	385,568
Hake, .....	22,310	18,308	41,767	36,440
Halibut, .....	3,919	3,343	6,671	5,540
Lemon Soles, .....	3,115	2,227	5,501	4,413
Ling, .....	12,530	12,344	20,892	23,025
Megrims, .....	2,757	3,606	6,454	7,450
Monks (or Anglers), .....	3,559	3,923	6,849	8,039
Mullet (Red), .....	156	—	352	—
Plaice, .....	49,414	45,299	118,480	81,076
Pollack, .....	975	—	1,495	—
Skates and Rays, .....	29,420	27,848	58,067	58,021
Torsk, .....	626	691	1,236	1,664
Whiting, .....	25,445	20,995	53,760	45,680
Witches, .....	2,865	1,328	5,951	3,187
Mackerel, .....	20,256	2,265	23,581	4,408
Herrings, .....	224	89	6,218	10,185
Pilchards, .....	60	50	831	4,612
Sprats, .....	4,396	15,431	24,759	33,771
Fish, all other, except Shell Fish, .....	20,713	38,918	39,052	73,501
Total, .....	530,009	531,886	1,007,012	1,080,168
Shell Fish:—	No.	No.	No.	No.
Crabs, .....	175,257	182,542	255,831	275,951
Lobsters, .....	20,010	8,202	29,732	14,990
Oysters, .....	2,966,050	3,464,500	6,389,450	6,885,300
Other Shell Fish, .....	Cwts.	Cwts.	Cwts.	Cwts.
	30,254	29,328	66,177	62,676

NOTE.—The figures for 1905 are subject to correction in the Annual Returns.  
 \* Bream, Coalfish, Dogfish, Dory, Red Mullet, and Pollack, were not separately distinguished in 1904.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Two Months ended 28th February, 1905, compared with the corresponding Periods of the Year 1904.

	February.		Two Months ended February.	
	1905.	1904.	1905.	1904.
	VALUE.			
	£	£	£	£
Brill, ... ..	6,470	6,820	12,544	12,977
Soles, ... ..	34,250	33,775	68,644	63,719
Turbot, ... ..	22,585	24,736	44,886	47,345
Other Prime Fish, ... ..	—	—	—	—
Total Prime Fish, ...	63,305	65,331	126,074	124,041
Bream, ... ..	798	—	2,034	—
Outfish, ... ..	1,410	925	2,039	1,564
Coalfish, ... ..	2,613	—	5,155	—
Cod, ... ..	88,024	86,407	161,432	152,148
Conger Eels, ... ..	4,159	3,554	7,315	6,446
Dabs, ... ..	7,885	9,202	14,260	16,703
Dogfish, ... ..	468	—	1,391	—
Dory, ... ..	183	—	467	—
Gurnards, ... ..	2,645	2,988	5,157	5,394
Haddock, ... ..	133,158	145,457	252,129	286,309
Hake, ... ..	21,977	16,886	42,707	33,898
Halibut, ... ..	13,231	12,956	23,209	21,999
Lemon Soles, ... ..	8,257	7,308	15,530	14,978
Ling, ... ..	9,629	8,364	16,265	14,935
Megrims, ... ..	2,272	3,114	4,935	5,808
Monks (or Anglers), ... ..	1,587	1,324	2,987	2,673
Mullet (Red), ... ..	283	—	777	—
Plaice, ... ..	64,044	60,037	144,513	112,440
Pollack, ... ..	677	—	1,034	—
Skates and Rays, ... ..	19,009	19,156	37,090	37,671
Torsk, ... ..	306	326	642	788
Whiting, ... ..	14,782	11,178	31,525	22,534
Witches, ... ..	3,192	1,783	6,834	3,786
Mackerel, ... ..	17,364	3,528	21,589	6,506
Herrings, ... ..	128	38	3,763	4,526
Pilchards, ... ..	22	20	170	1,569
Sprats, ... ..	751	1,883	3,736	3,881
Fish, all other, except Shell Fish, ...	11,288	21,309	21,081	38,885
Total, ... ..	493,447	483,674	915,840	919,482
Shell Fish :—				
Crabs, ... ..	2,074	1,851	3,189	2,892
Lobsters, ... ..	1,019	475	1,499	892
Oysters, ... ..	3,980	10,183	18,758	21,111
Other Shell Fish, ... ..	7,042	6,799	14,758	14,221
Total, ... ..	19,115	19,308	38,204	39,116
Total value of all Fish, ...	512,562	502,982	984,044	958,598

NOTE.—The figures for 1905 are subject to correction in the Annual Returns. Bream, Coalfish, Dogfish, Dory, Red Mullet, and Pollack were not separately distinguished in 1904.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the IRISH COASTS during the Month and Two Months ended 28th February, 1905, compared with the corresponding Periods of the Year 1904.

	February.		Two Months ended February.	
	1905.	1904.	1905.	1904.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Brill, ... ..	29	9	47	21
Soles, ... ..	211	91	330	170
Turbot, ... ..	46	37	96	70
Total Prime Fish, ... ..	285	137	473	261
Cod, ... ..	2,625	3,917	4,812	6,849
Conger Eel, ... ..	487	504	684	993
Haddock, ... ..	1,199	1,576	2,381	3,324
Hake, ... ..	479	550	710	1,025
Herrings, ... ..	3,238	3,138	10,702	14,608
Ling, ... ..	1,015	386	1,461	956
Mackerel, ... ..	1,567	—	3,599	151
Plaice, ... ..	1,604	1,478	2,530	2,024
Ray or Skate, ... ..	635	545	946	1,028
Sprats, ... ..	18	—	49	18
Whiting, ... ..	1,241	3,564	2,782	6,410
Fish not separately distinguished, except shell fish.	1,491	2,099	2,823	4,463
Total, ... ..	15,884	17,894	33,952	41,910
Shell Fish:—	No.	No.	No.	No.
Crabs, ... ..	460	160	750	609
Lobsters, ... ..	1,910	2,146	3,624	4,032
Oysters, ... ..	97,236	38,717	158,254	138,901
Mussels, ... ..	1,083	659	2,370	1,329
Other Shell Fish, ... ..	1,929	1,341	3,565	2,766
VALUE.				
	£	£	£	£
Brill, ... ..	37	47	78	93
Soles, ... ..	1,213	498	1,747	865
Turbot, ... ..	235	253	512	436
Total Prime Fish, ... ..	1,485	798	2,337	1,394
Cod, ... ..	1,722	2,703	3,139	4,540
Conger Eel, ... ..	243	318	355	633
Haddock, ... ..	801	1,080	1,554	2,139
Hake, ... ..	789	556	1,190	1,066
Herrings, ... ..	800	1,113	3,077	4,362
Ling, ... ..	869	190	1,271	408
Mackerel, ... ..	679	—	1,445	70
Plaice, ... ..	1,802	1,238	2,815	1,794
Ray or Skate, ... ..	489	198	612	358
Sprats, ... ..	5	—	13	3
Whiting, ... ..	989	1,933	1,868	3,304
Fish not separately distinguished, except shell fish.	912	1,125	1,744	2,208
Total, ... ..	11,485	11,252	21,420	22,289
Shell Fish:—				
Crabs, ... ..	2	1	3	14
Lobsters, ... ..	92	100	171	187
Oysters, ... ..	156	68	272	206
Mussels, ... ..	115	71	232	132
Other Shell Fish, ... ..	383	270	715	551
Total, ... ..	748	510	1,383	1,070
Total Value of Fish Landed, ... ..	12,233	11,762	22,803	23,359

NOTE.—The figures for 1905 are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the SCOTTISH COASTS during the Month and Two Months ended 28th February, 1905, compared with the corresponding periods of the Year 1904.

	February.		Two Months ended February.	
	1905.	1904.	1905.	1904.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Sparling, ... ..	47	32	63	57
Turbot, ... ..	515	478	886	969
Cod, ... ..	49,565	45,771	86,532	97,637
Conger Eel, ... ..	3,922	4,516	5,358	6,279
Flounders, Plaice, Brill, ... ..	6,436	6,400	10,577	11,447
Haddock, ... ..	77,881	70,983	139,119	151,302
Halibut, ... ..	1,051	1,161	1,739	1,965
Herrings, ... ..	245,709	299,735	380,864	428,609
Lemon Soles, ... ..	1,513	1,109	2,893	2,380
Ling, ... ..	10,102	11,017	14,773	16,164
Mackerel, ... ..	57	330	94	377
Salth (Coal Fish), ... ..	7,022	6,401	11,818	11,815
Skate and Rays, ... ..	9,175	11,101	15,505	19,862
Sprats, ... ..	262	7,692	1,167	17,768
Torsk (Tusk), ... ..	503	688	885	1,382
Whiting, ... ..	16,136	11,018	31,142	24,729
Fish not separately distinguished, except Shell Fish.	6,378	6,157	13,167	15,001
Total, ... ..	436,274	484,599	716,602	809,703
Shell Fish:—	No.	No.	No.	No.
Crabs, ... ..	107,860	120,795	191,336	158,158
Lobsters, ... ..	20,988	34,091	54,340	73,941
Oysters, ... ..	27,700	25,654	52,460	60,090
	Cwts.	Cwts.	Cwts.	Cwts.
Clams, ... ..	1,076	788	2,134	1,717
Mussels, ... ..	8,606	7,546	18,914	18,261
Other Shell Fish, ... ..	6,097	5,310	9,910	8,417
VALUE.				
	£	£	£	£
Sparling, ... ..	119	106	159	188
Turbot, ... ..	1,910	2,117	3,379	4,156
Cod, ... ..	24,804	24,110	46,966	47,462
Conger Eel, ... ..	1,909	2,339	2,611	3,254
Flounders, Plaice, Brill, ... ..	8,033	8,823	13,704	16,371
Haddock, ... ..	51,085	49,330	96,642	98,126
Halibut, ... ..	2,080	2,650	3,805	4,736
Herrings, ... ..	48,922	59,439	87,529	107,822
Lemon Soles, ... ..	3,230	3,238	6,656	6,831
Ling, ... ..	4,189	4,699	6,278	7,303
Mackerel, ... ..	29	158	48	193
Salth (Coal Fish), ... ..	1,678	1,607	2,096	2,809
Skate and Rays, ... ..	5,040	3,924	5,493	7,136
Sprats, ... ..	65	358	240	778
Torsk (Tusk), ... ..	172	429	517	390
Whiting, ... ..	6,774	4,855	13,176	9,609
Fish not separately distinguished, except Shell Fish.	4,627	5,938	10,061	12,328
Total, ... ..	162,661	173,860	300,063	329,492
Shell Fish:—				
Crabs, ... ..	479	524	926	1,016
Lobsters, ... ..	1,286	2,257	3,283	4,526
Oysters, ... ..	108	98	208	244
Clams, ... ..	153	116	308	256
Mussels, ... ..	513	473	1,184	1,102
Other Shell Fish, ... ..	1,290	1,481	2,151	2,291
Total, ... ..	3,829	4,949	8,160	9,435
Total Value of Fish landed,	166,490	178,829	308,123	338,927

NOTE.—The above figures are subject to correction in the Annual Returns.



RETURN of AVERAGE PRICES for each PROVINCE and for the WHOLE OF IRELAND of certain Classes of AGRICULTURAL PRODUCTS and LIVE STOCK for the QUARTER ended 31st DECEMBER, 1904, and for the WHOLE OF IRELAND for the corresponding QUARTER of 1903.

PRODUCT.	PROVINCE.				Whole of Ireland, 1904.	Whole of Ireland, 1903.
	Leinster.	Munster.	Ulster.	Con-naught.		
CROPS :—	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Wheat, per 112 lbs.	7 4	6 7½	—	—	7 2½	6 4½
White Oats, . . .	6 2½	6 5	5 5½	5 10½	5 10½	5 7½
Black Oats, . . .	5 9½	4 10½	—	—	4 11½	4 7½
Barley, . . .	6 10	7 2½	—	6 11½	7 2½	6 11½
Hay, . . .	3 9½	2 5	3 1½	2 0	3 0½	2 10½
Potatoes, . . .	2 7	3 2½	2 3½	3 11½	2 8½	3 5½
Flax, . . . per 14 lbs.	—	—	7 0	—	7 0	6 1½
Perennial Rye Grass Seed, per 112 lbs.	—	—	8 8½	—	8 8½	12 10½
Italian Rye Grass Seed, . . .	—	—	9 9½	—	9 9½	12 6½
BUTTER, . . .	97 10	97 8	97 7½	85 10½	97 4½	102 10
EGGS, . . . per 120.	11 1½	10 10½	—	9 6½	10 2	9 11½
WOOL, . . . per lb.	0 10½	0 10½	—	—	0 10½	0 8
PORK, . . . per 112 lbs.	—	40 2½	41 2½	39 3½	40 3	41 5½
BEEF, . . .	—	—	—	—	51 0	51 5½
MUTTON, . . .	—	—	—	—	61 2½	59 2½
STORE CATTLE :—	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
One year old, per head,	7 16 1	7 14 0	6 3 5	7 12 6	7 7 3	7 10 11
Two years old, . . .	11 1 11	10 8 9	8 8 7	10 5 3	10 5 11	10 6 7
Three years old, . . .	13 5 1	13 14 2	9 2 7	11 17 1	12 11 0	12 12 2
Springers . . .	14 14 11	13 18 2	13 0 2	14 7 5	13 17 0	14 7 11
STORE SHEEP :—						
Lambs, . . . per head,	1 10 4	1 9 7	—	1 6 11	1 8 5	1 6 11
Over 12 & under 24 months old, . . .	2 2 10	2 2 1	—	2 0 8	2 1 2	1 19 1
Two years old and upwards, . . .	1 16 11	1 6 2	—	2 7 4	2 6 9	2 4 6

STATEMENT showing the AVERAGE PRICES of WHEAT, BARLEY and OATS per 112 lbs., computed from Market Returns of certain quantities of these Cereals supplied to the Department of Agriculture and Technical Instruction for Ireland by Inland Revenue Officers, for each Week of the QUARTER ended 31st DECEMBER, 1904.

Returns received in the Week ended	WHEAT.		BARLEY.		OATS.	
	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.
	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.
October 1.	7 4½	762½	7 3½	17,238	5 3½	30,661
" 8.	7 2½	335	7 3½	20,437	5 3	27,093½
" 15.	7 4	1,424	7 1½	23,114	5 3½	22,655½
" 22.	7 4½	798½	7 0	11,783	5 4	19,660½
" 29.	7 4	525	7 2	11,722	5 3½	16,557½
November 5.	7 3½	545	7 2½	7,979	5 3½	17,997½
" 12.	7 2½	435	7 1½	2,850	5 4½	15,763½
" 19.	7 2½	2,362½	6 11	1,513	5 5½	15,031½
" 26.	7 1½	593½	7 5½	1,685	5 7	9,873
December 3.	6 11	547½	7 2½	372	5 5½	13,018½
" 10.	6 8	112½	7 6½	112	5 5½	9,994½
" 17.	6 8	80	6 1½	153½	5 5½	7,660½
" 24.	6 8	45	5 6½	36½	5 5½	6,258
" 31.	6 8	42½	5 10	10	5 6½	5,127½

TABLE showing the AVERAGE PRICE per 112 lbs., LIVE WEIGHT, of FAT CATTLE and FAT SHEEP sold in the DUBLIN MARKET during the QUARTER ended 31st DECEMBER, 1904, and also for the corresponding period during the seven preceding years.

DESCRIPTION.	YEAR.							
	1904.	1903.	1902.	1901.	1900.	1899.	1898.	1897.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Fat Cattle.	29 1½	29 4½	31 5	29 11½	30 7½	30 7½	27 8½	28 1½
" Sheep.	34 11½	33 10	32 3	30 2½	32 3½	32 4½	31 5	32 7

**STATEMENT showing the NUMBERS of CATTLE and SHEEP in respect of which "LIVE WEIGHT" Returns have been furnished to the Department of Agriculture and Technical Instruction for Ireland, as under, during the Quarter ended 31st December, 1904.**

WEEK ENDED	Numbers included in Returns of Live Weight of Fat Cattle furnished by			Numbers included in Returns of Live Weight of Fat Sheep furnished by		Total Number of Sheep included in Returns.
	Dublin Corporation Market Authorities.	Mr. Gavin Low (Dublin).	Mr. John Robson (Belfast).	Dublin Corporation Market Authorities.	Mr. Gavin Low (Dublin).	
Oct. 1. . . . .	74	179	18	24	220	244
" 8. . . . .	93	161	21	15	133	153
" 15. . . . .	106	209	24	42	391	433
" 22. . . . .	96	203	23	—	247	247
" 29. . . . .	94	173	21	15	119	134
Nov. 5. . . . .	100	209	17	15	202	217
" 12. . . . .	69	113	21	23	233	326
" 19. . . . .	110	126	15	—	243	248
" 26. . . . .	74	165	14	28	431	459
Dec. 3. . . . .	83	164	26	40	262	302
" 10. . . . .	75	123	20	—	295	295
" 17. . . . .	68	163	—	5	279	284
" 24. . . . .	62	65	16	10	60	70
" 31. . . . .	64	157	16	15	156	171
Totals. . . . .	1,163	2,215	255	237	3,346	3,683
			159			3,797

## CREAMERY BUTTER PRICE STATISTICS.

Week ending	Copenhagen Top Quotations.		Manchester.				Lb. Rolls. In 24-lb. case. Per Cwt.	
	Kroner per 50 Kilos.	Shil- lings per Cwt. ap- prox- imately.	Danish and Swedish Choicest.		Irish Creameries Choicest.		Danish. Free on rail, London.	Irish. Carriage paid, Passen- ger Train.
			All landed.				Cash with Order.	
	Kr.	s. d.	s.	s.	s.	s.	s. d.	s. d.
December, . 24,	91	102 2	117 to 119		No Quotations.		117 10	117 10
" . 31, 1906,	91	102 2	112 to 114				117 10	117 10
*January, . 7,	96	107 10	111 to 112				119 0	119 0
" . 14,	93	104 5	108 to 110				115 6	115 6
" . 21,	93	104 5	107 to 109				115 6	115 6
" . 28,	93	104 5	109 to 111				115 6	115 6
February, . 4,	93	104 5	108 to 110				115 6	115 6
" . 11,	94	105 7	108 to 110				116 8	116 8
" . 18,	94	105 7	108 to 110				116 8	116 8
" . 25,	94	105 7	107 to 110				116 8	116 8
March, . 4,	94	105 7	106 to 110				116 8	116 8
" . 11,	94	105 7	107 to 110				116 8	116 8
" . 18,	96	107 10	109 to 111				119 0	119 0

From Manchester prices, from 8s. to 10s. must be deducted in order to arrive at the net return to a Danish Creamery; and from 5s. to 7s. to get net return to an Irish Creamery.

Danish pound rolls are free on rail, London, wrapped in parchment and in cardboard boxes.

Irish pound rolls are carriage paid per passenger train, wrapped in parchment and in cardboard boxes.

If rolls are not packed in cardboard boxes, deduct  $\frac{1}{2}d.$  per lb. = 1s. 2d. per cwt.

An extra charge of  $\frac{1}{2}d.$  per lb. is made where cash does not arrive with order.

Carriage on pound rolls per passenger train is  $\frac{1}{2}d.$  per lb., excluding box; allowing for weight of box, carriage works out at 5s. 2d. to 5s. 8d. per cwt. of butter.

\* The overprice paid to Danish Creameries averaging 5 kroner (5s. 8d.) was included in this week's quotation, so that the actual price to the creameries was unaltered.

## TABLES SHOWING THE EXPORTS

## TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT  
PORTS of EMBARKATION

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ballina, . .	69	.	210	.	279	400	.	400	408	.	408
Belfast, . .	742	39,842	.	177	40,761	2,126	.	2,126	8,472	499	8,971
Coleraine, . .	.	133	20	.	153	139	.	139	7	.	7
Cork, . . .	1,663	12,284	1,327	16,405	30,679	9,164	.	9,164	10,823	.	10,823
Drogheda, . .	10,234	11,739	.	11	21,981	8,872	.	8,872	1,988	244	2,232
Dublin, . .	60,679	49,144	921	4,527	115,171	63,462	.	63,462	112,881	.	112,881
Dundalk, . .	1,140	6,100	.	1	7,241	5,196	.	5,196	9,847	503	10,350
Dundrum (Co. Down), . .	.	1	.	.	1	206	.	206	.	.	.
Greenore, . .	121	6,802	.	1	6,924	1,515	.	1,515	999	220	1,219
Larne, . . .	100	6,116	.	.	6,216	28	.	28	32	133	165
Limerick, . .	1,431	397	.	97	1,925	.	.	.	.	.	.
Londonderry, . .	881	13,612	342	2,989	17,854	4,700	668	5,368	3,756	129	3,885
Newry, . . .	40	1,957	.	.	1,997	1,046	.	1,046	802	11	813
Portrush, . .	3	169	.	.	172	.	.	.	337	.	337
Sligo, . . .	327	1,288	80	.	1,695	2,460	.	2,460	17,632	.	17,632
Waterford, . .	6,993	15,059	329	1,518	23,899	7,038	.	7,038	10,907	.	10,907
Westport, . .	430	60	244	.	754	3,518	.	3,518	3,597	.	3,597
Wexford, . .	685	223	.	1	909	4,442	.	4,442	4,147	.	4,147
Total, . . .	85,468	164,956	3,473	24,727	278,614	114,312	668	114,980	186,635	1,739	188,374

## AND IMPORTS OF ANIMALS.

## I.

BRITAIN during the Three Months ended 31st DECEMBER, 1904, showing the  
in Ireland.

Gonts.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	.	.	.	.	.	1,087	Ballina.
1	9	477	880	1,366	.	9	53,234	Belfast.
.	.	.	.	.	.	.	299	Coleraine.
.	1	156	299	456	.	6	51,128	Cork.
5	.	12	32	44	.	.	33,137	Drogheda.
12	34	1,067	1,021	2,122	1	2	293,651	Dublin.
.	.	82	88	170	.	.	22,957	Dundalk.
.	.	.	.	.	.	.	207	Dundrum (Co. Down).
1	7	465	294	766	.	2	10,427	Greenore.
.	2	63	69	134	.	.	6,543	Larne.
.	.	2	5	7	.	.	1,932	Limerick.
1	2	30	27	59	.	.	27,167	Londonderry.
.	.	1	5	6	.	2	3,564	Newry.
.	.	.	1	1	.	.	510	Portrush.
.	.	7	.	7	.	.	21,794	Sligo.
.	.	438	448	886	1	10	48,741	Waterford.
.	.	3	2	5	.	.	7,574	Westport.
.	.	2	12	14	.	.	9,512	Wexford.
20	55	2,805	3,183	6,043	2	31	588,064	Total.

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT  
PORTS of DEBARKATION

BRITISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lamba.	Total.	Fat.	Stores.	Total.
Ardrossan, .	315	9,199	.	97	9,611	12	.	12	143	318	461
Ayr, . . .	163	12,831	.	79	13,063	70	.	70	1,317	306	1,823
Barrow, . .	83	2,438	.	2	2,523	235	.	235	5,311	81	5,392
Bristol, . .	832	9,791	.	2,663	13,286	2,416	.	2,416	6,129	.	6,129
Cardiff, . .	.	.	.	.	.	.	.	.	.	.	.
Douglas, . .	.	.	.	.	.	.	.	.	.	.	.
Fleetwood .	47	2,940	.	.	2,987	1,781	.	1,781	1,037	.	1,037
Glasgow, . .	9,762	38,090	2,758	5,634	56,144	846	48	894	15,012	81	15,093
Greenock, . .	70	2,089	4	18	2,181	5	.	5	145	48	193
Heysham, . .	1,645	9,448	.	43	11,136	2,643	.	2,643	22,722	.	22,722
Holyhead, .	11,666	20,895	.	1,717	34,278	18,308	.	18,308	62,078	220	62,298
Liverpool, .	45,623	39,543	711	4,885	90,762	71,637	620	72,257	62,800	616	63,415
London, . .	.	.	.	.	.	.	.	.	.	.	.
Manchester, .	6,855	1,816	.	.	8,670	6,140	.	6,140	1,510	.	1,510
Milford, . .	4,066	8,663	.	8,690	21,419	9,972	.	9,972	8,208	.	8,208
Morecambe, .	.	.	.	.	.	.	.	.	.	.	.
Newhaven, .	.	38	.	.	38	.	.	.	.	.	.
Plymouth, .	573	195	.	662	1,430	.	.	.	.	.	.
Portsmouth, .	.	.	.	.	.	.	.	.	.	.	.
Silloth, . .	3,511	1,179	.	.	4,690	20	.	20	.	.	.
Southampton, .	170	105	.	337	612	21	.	21	223	.	223
Stranraer, .	87	5,696	.	.	5,783	.	.	.	.	70	70
Whitehaven, .	.	1	.	.	1	206	.	206	.	.	.
Total, . .	85,458	164,956	3,473	24,727	278,614	114,312	668	114,980	186,635	1,789	188,374

## II.

BRITAIN during the Three Months ended 31st DECEMBER, 1904, showing the in Great Britain.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	BRITISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	33	90	123	.	1	10,208	Ardrossan.
.	.	21	53	74	.	.	14,530	Ayr.
.	.	30	95	125	.	1	8,276	Barrow.
.	.	83	168	251	.	2	22,034	Bristol.
.	.	.	.	.	.	.	.	Cardiff.
.	.	.	.	.	.	.	.	Douglas.
1	.	194	311	505	.	.	6,311	Fleetwood.
.	2	110	170	282	.	2	72,415	Glasgow.
1	.	5	6	11	.	.	2,391	Greenock.
.	7	98	141	246	.	4	36,751	Heysham.
2	40	1,219	1,007	2,266	1	3	117,156	Holyhead.
16	3	407	450	860	1	6	227,317	Liverpool.
.	.	2	3	5	.	.	5	London.
.	.	12	17	29	.	.	16,349	Manchester.
.	.	469	541	1,013	.	10	40,622	Milford.
.	.	.	.	.	.	.	.	Morecambe.
.	.	.	1	1	.	1	40	Newhaven.
.	1	13	17	31	.	.	1,461	Plymouth.
.	.	1	.	1	.	.	1	Portsmouth.
.	.	24	14	38	.	1	4,749	Silloth.
.	.	21	27	48	.	.	904	Southampton.
.	2	63	69	134	.	.	5,967	Stranraer.
.	.	.	.	.	.	.	207	Whitehaven.
90	55	2,805	3,183	6,043	2	31	588,064	Total.



TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT  
of DEBARKATION

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ballina, . . .	.	.	.	.	.	.	.	.	.	.	.
Belfast, . . .	.	19	.	2	21	5,686	.	5,686	.	2	2
Coleraine, . . .	.	.	.	.	.	27	.	27	.	.	.
Cork, . . .	.	3	.	.	3	221	.	221	.	.	.
Drogheda, . . .	.	.	.	.	.	.	.	.	.	.	.
Dublin, . . .	.	78	.	6	84	5,023	608	5,631	.	1	1
Dundalk, . . .	.	4	.	.	4	130	.	130	.	.	.
Dundrum, . . .	.	.	.	.	.	.	.	.	.	.	.
Greenore, . . .	.	1	.	.	1	.	.	.	.	.	.
Larne, . . .	.	21	.	6	27	632	.	632	.	.	.
Limerick, . . .	.	.	.	.	.	2	60	62	.	.	.
Londonderry . . .	.	.	.	.	.	100	820	920	.	.	.
Newry, . . .	.	.	.	.	.	45	.	45	.	.	.
Portrush, . . .	.	.	.	.	.	.	111	111	.	.	.
Sligo, . . .	.	.	.	.	.	99	.	99	.	.	.
Waterford, . . .	.	.	.	2	2	131	3	134	.	.	.
Westport, . . .	.	.	.	.	.	3	.	3	.	.	.
Wexford, . . .	.	.	.	.	.	1	.	1	.	.	.
Total, . . .	.	126	.	16	142	12,100	1,502	13,702	.	3	3

## III.

BRITAIN during the Three Months ended 31st DECEMBER, 1904, showing the PORTS in Ireland.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	.	.	.	.	.	.	Ballina
.	1	84	218	303	.	2	6,014	Belfast.
.	.	.	1	1	.	.	28	Coleraine.
.	.	32	46	78	.	.	302	Cork.
.	.	3	9	12	.	.	12	Drogheda.
1	10	274	226	610	.	1	6,228	Dublin.
.	.	2	2	4	.	.	138	Dundalk.
.	.	.	.	.	.	.	.	Dundrum.
.	.	33	31	64	.	.	66	Greenore.
2	.	41	26	67	.	.	723	Larne.
.	.	.	1	1	.	.	63	Limerick.
.	2	24	9	35	.	.	855	Londonderry.
.	.	4	7	11	.	.	56	Newry.
.	.	5	8	13	.	.	124	Portrush.
.	.	25	3	28	.	.	127	Sligo.
.	1	67	84	152	.	2	290	Waterford.
.	.	.	.	.	.	.	3	Westport.
.	.	1	4	5	.	.	6	Wexford.
3	14	596	676	1,284	.	5	15,139	Total.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT BRITAIN  
EMBARKATION in

BRITISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lamba.	Total.	Fat.	Stores.	Total.
Ardrossan, .	.	7	.	2	9	1,003	.	1,003	.	.	.
Ayr, . .	.	3	.	.	3	4,680	.	4,680	.	.	.
Barrow, . .	.	.	.	.	.	.	.	.	.	.	.
Bristol, . .	.	2	.	2	4	27	.	27	.	.	.
Falmouth, .	.	11	.	.	11	.	.	.	.	.	.
Fleetwood, .	.	.	.	.	.	.	.	.	.	.	.
Glasgow, . .	.	37	.	4	41	4,394	1,596	5,990	.	2	2
Greenock, . .	.	.	.	.	.	321	1	322	.	.	.
Heysham, . .	.	.	.	.	.	2	.	2	.	.	.
Holyhead, . .	.	37	.	2	39	40	.	40	.	1	1
Liverpool, . .	.	4	.	.	4	.	.	.	.	.	.
London, . .	.	.	.	.	.	.	.	.	.	.	.
Manchester, . .	.	.	.	.	.	.	.	.	.	.	.
Milford, . .	.	1	.	.	1	.	3	3	.	.	.
Plymouth, . .	.	.	.	.	.	1	.	1	.	.	.
Portsmouth, . .	.	1	.	.	1	.	.	.	.	.	.
Silloth, . .	.	.	.	.	.	1,202	1	1,203	.	.	.
Southampton, . .	.	2	.	.	2	.	1	1	.	.	.
Stranraer, . .	.	21	.	6	27	430	.	430	.	.	.
Whitehaven, . .	.	.	.	.	.	.	.	.	.	.	.
Total, . .	.	128	.	18	142	12,100	1,602	13,702	.	3	3

## IV.

during the Three Months ended 31st DECEMBER, 1904, showing the PORTS of Great Britain.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	BRITISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	15	49	64	.	.	1,076	Ardrossan.
.	.	4	11	15	.	.	4,698	Ayr.
.	.	.	2	2	.	.	2	Barrow.
.	1	16	22	39	.	2	72	Bristol.
.	.	1	.	1	.	.	12	Falmouth.
.	1	36	72	109	.	2	111	Fleetwood.
.	3	96	99	198	.	.	6,231	Glasgow.
.	1	4	7	12	.	.	384	Greenock.
.	.	4	11	15	.	.	17	Heysham.
1	8	245	191	444	.	1	526	Holyhead.
.	.	48	84	132	.	.	136	Liverpool.
.	.	1	.	1	.	.	1	London.
.	.	1	.	1	.	.	1	Manchester.
.	.	49	67	116	.	.	120	Milford.
.	.	30	32	62	.	.	63	Plymouth.
.	.	1	1	2	.	.	3	Portsmouth.
.	.	1	1	2	.	.	1,205	Silloth.
.	.	5	7	12	.	.	15	Southampton.
2	.	38	19	57	.	.	516	Stranraer.
.	.	.	.	.	.	.	.	Whitehaven.
3	14	595	675	1,284	.	5	15,139	Total.

**RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the  
showing the PORTS of**

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs.	Total.
BELFAST, . . . . .	19	84	.	.	103	.	.	.
DUBLIN, . . . . .	16	155	.	.	171	.	.	.
TOTAL . . . . .	35	239	.	.	274	.	.	.

**RETURN of NUMBER of ANIMALS EXPORTED from IRELAND to the  
showing the PORTS of DEBARKATION**

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs.	Total.
DOUGLAS, . . . . .	35	239	.	.	274	.	.	.

**RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the  
showing the PORTS of**

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs.	Total.
BELFAST, . . . . .	.	.	.	.	.	.	.	.
DUBLIN, . . . . .	.	.	.	.	.	.	.	.
TOTAL, . . . . .	.	.	.	.	.	.	.	.

**RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the  
showing the PORTS of EMBARKATION**

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs.	Total.
DOUGLAS, . . . . .	.	.	.	.	.	.	.	.

ISLE OF MAN during the Three Months ended 31st DECEMBER, 1904,  
EMBARKATION in IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	.	.	.	.	.	108	BELFAST.
.	.	.	.	.	.	.	.	.	.	171	DUBLIN.
.	.	.	.	.	.	.	.	.	.	274	TOTAL.

ISLE OF MAN during the Three Months ended 31st DECEMBER, 1904,  
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	.	.	.	.	.	274	DOUGLAS.

ISLE OF MAN during the Three Months ended 31st DECEMBER, 1904,  
DEBARKATION in IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	1	1	2	.	.	2	BELFAST.
.	.	.	.	.	.	.	.	.	.	.	DUBLIN.
.	.	.	.	.	1	1	2	.	.	2	TOTAL.

ISLE OF MAN during the Three Months ended 31st DECEMBER, 1904,  
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	1	1	2	.	.	2	DOUGLAS.

## COASTING AND

RETURN of the NUMBER of ANIMALS SHIPPED to and from Places in Ireland  
of Embarkation

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, .	.	1	.	10	11	.	.	.	1	.	1
" to Belfast, .	.	12	.	10	22	.	.	.	.	.	.
" to Spike Island, .	.	.	.	.	.	.	.	.	.	4	4
" to Waterford, .	.	14	.	12	26	.	.	.	.	.	.
Total, .	.	27	.	32	59	.	.	.	1	4	5
Aghada Pier to Cork, .	.	.	.	1	1	25	.	25	147	.	147
Dublin to Cork, .	.	.	.	.	.	.	.	.	.	.	.
Waterford to Belfast, .	28	22	.	.	50	.	.	.	.	.	.
" to Cork, .	.	2	.	.	2	2	.	2	.	.	.
" to Duncannon, .	.	128	.	36	164	.	.	.	.	13	13
" to New Ross, .	.	139	.	141	280	.	.	.	.	.	.
Total, .	28	291	.	177	496	2	.	2	.	13	13
Belfast to Waterford, .	.	.	.	.	.	.	.	.	.	.	.
Duncannon to Waterford, .	38	201	.	1	240	82	.	82	1,671	.	1,671
New Ross to Waterford, .	186	185	.	11	382	1,704	.	1,704	1,597	.	1,597
Kilrush to Limerick, .	4	27	.	.	31	.	.	.	732	.	732
Kildysart " .	.	32	6	.	38	.	.	.	1,046	.	1,046
Tarbert " .	.	11	.	.	11	.	.	.	342	.	342
Glin " .	.	.	.	.	.	.	.	.	199	.	199
Total, .	4	70	6	.	80	.	.	.	2,819	.	2,819
Londonderry to Moville, .	.	4	1	.	5	10	.	10	6	24	30
Moville to Londonderry, .	6	74	2	.	82	89	20	109	51	.	51
Mulroy to Portrush, .	.	.	.	.	.	.	.	.	.	1	1
Greencastle to Greenore, .	.	74	.	.	74	.	.	.	14	.	14
Sligo to Belmullet, .	.	.	.	.	.	.	.	.	.	.	.
Belmullet to Sligo, .	.	36	.	.	36	32	.	32	1,783	2	1,785
Total, .	263	962	9	223	1,455	1,944	20	1,964	7,504	44	7,538

## INLAND NAVIGATION.

during the Three Months ended 31st December, 1904, showing the Places and Debarkation.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	1	.	1	.	.	13	Cork to Aghada Pier,
.	.	1	.	1	.	.	23	" to Belfast.
.	.	.	.	.	.	.	4	" to Spike Island.
.	.	.	1	1	.	.	27	" to Waterford.
.	.	2	1	3	.	.	67	Total.
.	.	.	.	.	.	.	173	Aghada Pier to Cork.
.	.	.	.	.	.	.	.	Dublin to Cork.
.	.	.	.	.	.	.	50	Waterford to Belfast.
.	.	.	.	.	.	.	4	" to Cork.
.	.	4	3	7	1	6	191	" to Duncannon.
.	.	1	1	2	.	1	283	" to New Ross.
.	.	5	4	9	1	7	523	Total.
.	.	.	1	1	.	.	1	Belfast to Waterford.
.	.	.	.	.	.	.	1,993	Duncannon to Waterford.
.	.	4	.	4	.	1	3,688	New Ross to Waterford.
.	.	.	.	.	.	.	763	Kilrush to Limerick.
.	.	.	.	.	.	.	1,084	Kildysart "
.	.	.	.	.	.	.	353	Tarbert "
.	.	.	.	.	.	.	199	Glin "
.	.	.	.	.	.	.	2,399	Total.
.	.	.	.	.	.	.	45	Londonderry to Moville.
1	.	.	.	.	.	.	243	Moville to Londonderry.
.	.	.	.	.	.	.	1	Mulroy to Portrush.
.	.	1	.	1	.	.	89	Greencastle to Greenore.
.	.	1	.	1	.	.	1	Sligo to Belmullet.
.	.	.	1	1	.	.	1,859	Belmullet to Sligo.
1	.	13	7	20	1	8	11,037	Total.



RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31st DECEMBER, 1904, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast, . . . . .	--	70	51	121
Cork, . . . . .	—	1	—	1
Dublin, . . . . .	—	16	16	32
Greenore, . . . . .	7	174	89	270
Waterford, . . . . .	—	5	8	13
Total, . . . . .	7	266	164	437

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31st DECEMBER, 1904, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast, . . . . .	—	14	32	46
Dublin, . . . . .	—	—	—	—
Total, . . . . .	—	14	32	46

## DISEASES OF ANIMALS IN IRELAND.

NUMBER of OUTBREAKS of SWINE-FEVER, and Number of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended	SWINE-FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection.
December, 1904, . . . . .	7	437

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by ANTHRAX and GLANDERS in Ireland in the undermentioned period.

Quarter ended	ANTHRAX.		GLANDERS (including Farcy)		Epizootic Lymphangitis	
	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
December, 1904, . . . . .	1	4	2	4	.	.

NUMBER of Cases of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended	Number of Cases.
December, 1904, . . . . .	Nil.

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIC-MANGE in Ireland in the undermentioned period.

Quarter ended	SHEEP-SCAB.		PARASITIC-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
December, 1904, . . . . .	108	1,223	17	29

Veterinary Branch,  
Department of Agriculture and Technical Instruction for Ireland,  
Dublin.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL  
into Ireland in each WEEK from

ARTICLES.	WEEK ENDED				
	3rd Dec.	10th Dec.	17th Dec.	24th Dec.	31st Dec.
ANIMALS, LIVING—					
Horses, . . . . .	.	.	.	.	.
FRESH MEAT—					
Beef, . . . . . cwt.	.	.	.	.	.
Mutton, . . . . . "	.	.	.	.	.
SALTED OR PRESERVED MEAT—					
Bacon, . . . . . cwt.	.	.	.	.	.
Beef, . . . . . "	.	.	.	.	.
Hams, . . . . . "	1	.	4	.	.
Pork, . . . . . "	.	.	300	190	.
Meat, unenumerated, Salted or Fresh, . . . . .	.	.	.	.	.
Meat preserved otherwise than by salting, . . . . . cwt.	.	8	.	.	1,717
DAIRY PRODUCE AND SUBSTITUTES—					
Butter, . . . . . cwt.	.	.	.	.	.
Margarine, . . . . . "	138	215	182	149	101
Cheese, . . . . . "	304	2	2	.	3
Milk, Condensed, . . . . . "	62	24	32	113	44
" Cream, . . . . . "	.	.	.	.	.
" Preserved, other kinds "	.	.	.	.	.
EGGS, . . . . . gt. hunds.	780	1,403	623	1,032	.
LARD, . . . . . cwt.	.	.	.	.	71
CORN, GRAIN, MEAL, AND FLOUR—					
Wheat, . . . . . cwt.	10,600	37,200	50,900	69,600	166,900
Wheat, Meal and Flour . . . . . "	30,400	40,300	7,300	5,000	64,300
Barley, . . . . . "	.	.	.	6,700	.
Oats, . . . . . "	.	8,100	.	.	10,800
Peas, . . . . . "	40	20	80	80	380
Beans, . . . . . "	.	.	.	.	.
Maize or Indian Corn, . . . . . "	260,800	258,300	.	197,000	293,000
FRUIT, RAW—					
Apples, . . . . . cwt.	570	246	.	.	12
Currants, . . . . . "	.	.	.	.	.
Gooseberries, . . . . . "	.	.	.	.	.
Pears, . . . . . "	.	.	.	.	.
Plums, . . . . . "	.	.	.	.	.
Grapes, . . . . . "	.	.	.	.	.
Lemons, . . . . . "	60	.	.	.	.
Oranges, . . . . . "	60	.	.	.	.
Strawberries, . . . . . "	.	.	.	.	.
Unenumerated, . . . . . "	.	.	.	.	.
HAY, . . . . . tons	.	.	.	.	1
STRAW, . . . . . "	.	50	.	140	245
MOSS LITTER, . . . . . "	.	.	.	.	.
HOPS, . . . . . cwt.	.	.	.	.	40
VEGETABLES, RAW—					
Onions, . . . . . bushels	2,364	60	2,424	990	1,244
Potatoes, . . . . . cwt.	.	.	.	.	.
Tomatoes, . . . . . "	1	.	.	.	.
Unenumerated, . . . . . £	.	.	.	.	.
Dried, . . . . . cwt.	.	.	.	.	.
Preserved by Canning, . . . . . "	.	.	.	.	.
POULTRY AND GAME, . . . . . £	.	.	.	.	.

\* This Table is confined to the Imports of certain kinds of Agricultural Produce into a request from this Department kindly consented to separate the Irish Imports (direct) form of Weekly Returns. It is hoped that the Department may soon be able to secure With these and such returns as the above, the Department will be in a position manufactured and agricultural products.

PRODUCE Imported direct (*i.e.* from the Colonies or Foreign Countries)  
3rd December, 1904, to 25th February, 1905\*.

WEEK ENDED							
7th Jan.	14th Jan.	21st Jan.	28th Jan.	4th Feb.	11th Feb.	18th Feb.	25th Feb.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	215	.	.	24	.	.
.	4	.	200	.	188	.	.
.	.	.	.	.	.	.	187
.	385	1,192	.	1,283	1,393	.	.
.	.	.	6	.	.	1	3
30	153	173	173	110	131	160	164
35	88	102	80	34	115	82	28
.	.	.	.	.	.	.	284
478	.	210	360	780	.	552	.
.	538	.	.	.	374	.	478
167,500	.	27,400	.	172,100	139,600	133,300	105,700
10,100	18,800	23,800	7,800	28,200	23,300	16,600	6,400
19,400	.	.	20,600	.	19,000	85,000	.
.	.	.	.	.	.	7,800	.
60	50	40	260	180	150	40	20
119,600	213,800	101,900	61,600	364,100	304,100	.	144,000
6	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	70	.	.
.	100	.	.	.	235	171	80
64	90	162	12	74	53	6	14
.	.	.	.	.	.	.	.
100	1,140	840	820	860	890	776	40
.	.	8	14	.	.	.	.
30	.	.	.	.	2	.	24
.	.	.	.	.	.	.	.

Ireland from the Colonies and Foreign Countries. The Board of Customs have in answer from those of the United Kingdom, and to supply this Department with them in the returns of Imports of all classes into Ireland which are re-shipped from Great Britain, to gauge the economic dependence of this country on other countries for its supplies of

Statistics and Intelligence Branch,  
Department of Agriculture  
and Technical Instruction for Ireland.

## EMIGRATION.

RETURN of the Numbers, Nationalities, and \*Destinations of the Passengers that left the United Kingdom for places out of Europe during the Month ended 28th February, 1905, and the Two Months ended 28th February, 1905, compared with the corresponding periods of the previous Year.

NATIONALITY.	BRITISH EMPIRE.						FOREIGN COUNTRIES.			Grand Total.	<i>Total for corresponding Period of 1904</i>
	British North America.	Australia and New Zealand.	British South Africa.	India, including Ceylon.	Other British Colonies and Possessions.	Total.	United States.	Other Foreign Countries.	Total.		
Month ended February.											
English, . . .	2,681	771	1,433	231	455	5,571	3,332	490	3,822	9,393	8,061
Scotch, . . .	127	84	276	19	30	536	814	54	868	1,404	1,239
Irish, . . .	100	24	68	1	3	196	1,164	16	1,180	1,376	904
Total of British origin.	2,908	879	1,777	251	488	6,303	5,310	560	5,870	12,173	10,204
Foreigners, . . .	924	11	340	12	18	1,305	10,803	462	11,265	12,570	6,567
Nationalities not distinguished.	2	-	-	125	148	275	99	256	355	630	508
Total, . . .	3,834	890	2,117	388	654	7,883	16,212	1,278	17,490	25,373	17,279
<i>Total for corresponding period, 1904.</i>	3,121	860	2,169	425	581	7,156	9,260	863	10,123	17,279	
Two Months ended February.											
English, . . .	4,576	1,630	2,892	554	801	10,454	6,089	920	7,009	17,463	15,451
Scotch, . . .	248	187	579	46	43	1,103	1,329	110	1,439	2,542	2,513
Irish, . . .	190	75	154	1	4	424	1,939	27	1,966	2,390	1,643
Total of British origin.	5,014	1,892	3,626	601	848	11,981	9,357	1,057	10,414	22,395	19,607
Foreigners, . . .	1,565	34	689	29	42	2,359	21,107	1,005	22,112	24,471	12,463
Nationalities not distinguished.	6	-	-	318	292	616	178	467	645	1,261	1,161
Total, . . .	6,685	1,926	4,315	948	1,182	14,956	30,642	2,529	33,171	48,127	33,231
<i>Total for corresponding period, 1904.</i>	5,141	1,855	5,359	1,007	1,321	14,683	16,766	1,782	18,548	33,231	

\* The destinations given are, in all cases, based on the ports at which the passengers contracted to land.

NOTE.—The above figures, being made up at the earliest possible date after the close of each Month, are subject to correction in the Annual Returns.

DEPARTMENT OF AGRICULTURE  
AND  
TECHNICAL INSTRUCTION FOR IRELAND.  
  
JOURNAL.

The Geological Survey of Ireland—The Linen Trade and its Raw Material—The Care of Milk for Creameries—Plans for Creamery Buildings—Cement Manufacture in Germany—The Organisation of French Agriculture—The Use of Alcohol in Industry—The Fruit Industry of Great Britain—Labourers' Holdings in Denmark—Official Documents—Notes and Memoranda—Statistical Tables.

FIFTH YEAR.

No. 4.

JULY, 1905.



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## NOTICE.

*Communications respecting the literary contents of this JOURNAL should be addressed to the Superintendent of the Statistics and Intelligence Branch, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin.*

*Communications respecting Advertisements should be addressed to ALEX. THOM & Co. (LIMITED), MIDDLE ABBEY-STREET, DUBLIN; or to LAUGHTON & Co. (LIMITED), 1 ESSEX-STREET, STRAND, LONDON, W.C., and not to the DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND,*







FIG. 1.—Volcanic features of northern Ireland. Triassic Sandstone veined and capped by Sills of Tolerite and intersected by a Basalt Dyke, South Quarry, Scrabo Hill, Co. Down (From memoir of Belfast district.)

## THE GEOLOGICAL SURVEY OF IRELAND.

On 1st April, 1905, by an Order of the Lord Lieutenant in Council, the "powers and duties hitherto exercised and performed by the Board of Education in respect of the Geological Survey of Ireland" were transferred to the Department of Agriculture and Technical Instruction for Ireland.

### **Transfer of the Survey to the Department, 1905.**

It may be fitting, then, to review at this time the position and work of a body that has, for more than seventy years, played an honourable part in the intellectual and industrial development of Ireland.

The knowledge of a country possessed by its inhabitants remains far from adequate if limited to the distribution of its present population and its industrial resources. The physical features of the country, the flow of its torrents, the gentler courses of navigable rivers through the plains, the position of its mountain barriers, and of the civilising passes opened through them, these are the common and fundamental features of geography, without which the development and history of the land are not to be grasped as a continuous and connected whole. Far away, again, beyond human history arise questions as to the migrations of plants and animals, and the successive stages that have given us the forms with which we are familiar to-day. And behind these questions, controlling alike the spread of adventurous insects and the march of nations, lies the geological structure of the country, which has given us, for example, the plain from which Tara rises, the heather-clad and hostile moor of Leinster, the gateways of invasion at Waterford and at Dublin, and the grey and indomitable ridges of Tirconnell in the cloud-swept west.

In 1833, a Committee of the House of Commons ordered a Townland Survey of Ireland, and some such considerations as the above led its organisers to undertake a scientific and comprehensive investigation of the country, almost yard by yard. This work was placed in charge of the Ordnance Survey, then under Colonel Colby, who introduced Lieutenant Larcom, at the age of twenty-seven, as chief of the surveying staff in Ireland. Colby\* always held "that the Topographical Survey

### **The Townland Survey of 1833.**

\* Quoted by Portlock, "Report on Geology of Londonderry," 1843, p. lii.

should be considered a foundation for Statistical, Antiquarian, and Geological Surveys;" and Captain Pringle, and, later, Captain Portlock, were selected as the first official geologists. Larcom, as Colby tells us,\* "conceived the idea that with such opportunities, a small additional cost would enable him, without retarding the execution of the maps, to draw together a work embracing every species of local information relating to Ireland." The Irish Government sanctioned the scheme, and a large collection of MSS., now lodged in the Library of the Royal Irish Academy, and the one volume published in 1837, on the Parish of Templemore, including the City of Londonderry, attest the generous spirit in which these enthusiasts embarked upon their design. Indeed, the foundation was hereby laid for Sir Thomas Aiskew Larcom's life-work in the development of Ireland.

In the "preliminary notice" to the memoir on Templemore, presumably from the hand of Larcom, we read that the first part deals with the description of the physical features of the ground, "their aspect, climate, and geological structure, as introductory to the several branches of natural history, which in great degree depend upon them. The Second Part, in like manner, based upon the map, describes in detail the roads, the buildings, and other works of art . . . because immediately following the natural state, they combine with it to complete a picture of the country as it now exists, and prepare the mind for an inquiry into its past history as a prelude to the proper understanding of its social and productive state. This historic inquiry naturally directs itself, in the first place, to the ancient buildings . . . and in the second, from the buildings themselves, to an account of the people by whom they were erected, and the state of society, of which they constitute the memorials. From this point the Third Part commences; its first division, social economy, beginning with the earliest history of the people, the septs, or clans, whose descendants still may inhabit the district . . . This account of the people and their establishments, leads naturally to the productive economy, which closes the work, as resulting from the means the people have been shown to possess for calling into beneficial action the natural state at first described."

By this time we had well-nigh forgotten the geological structure, to which we are called back in the concluding sentence. But

\* "Ordnance Survey of the County of Londonderry," vol. I. (1837), p. 6.

the general scheme reminds us of those wide and humane sociological surveys advocated in recent times by Prof. Patrick Geddes; and the fact that only one volume appeared of the hundreds that were intended to give Irishmen a knowledge of themselves throws no discredit on the scientific organisers. The frontispiece to "The Parish of Templemore" is a coloured geological map, on the scale of one inch to a mile, showing in a general way both the underlying crystalline rocks and the superficial covering of later sands and clays. Seven quarto pages are devoted to the description of the geology; and their author, Captain Portlock, manages to introduce his discoveries of fossils in the county of Tyrone in the form of three engraved plates and an appendix. These scientific appendices are in the nature of Survey "bulletins," and are distinctly stated to be issued for "the more speedy information of men of science, in anticipation of the parochial memoirs."

It is not surprising to find that the carrying out of conceptions of such breadth and magnitude, involving a sound study of the Irish people and its environments, lay beyond the powers of a Government department in 1837. The Ordnance Survey, however, retained the aid of specialists in science and in the Irish language for some years further, and Captain Portlock was able to produce, in 1843, his well-known "Report on the Geology of the County of Londonderry, and of parts of Tyrone and Fermanagh," a thick octavo volume, which is still fortunately on sale, and which abounds in the records of original observations. In the preface to it, Portlock describes the early days of the organisation, when Colby instituted in Belfast "a geological and statistical office, a museum for geological and zoological speci-

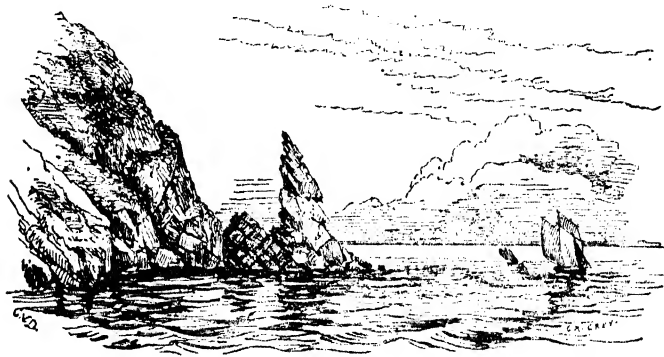
**A Soil-Laboratory** mens, and a laboratory for the examination  
**established, 1837.** of soils." He elsewhere points out\* that this museum, in its inception, preceded that at Jermyn-street, in London, which achieved under De la Beche, such permanent success. David Moore, Sir W. J. Hooker, Edward Forbes, and William Thompson, were called in to give help in natural history; and then, "at a period (1840), when every section of the department was moving forward with a prospect of success, the design of continuing the Londonderry memoir was abandoned, and the office, museum, and laboratory at Belfast, were in con-

\* "Memoir of Colby" (1869), p. 303.

sequence broken up, and everything connected with the department removed to Dublin.”\*

Sir Richard John Griffith was at this time preparing for the Valuation Office his great geological map of Ireland on the scale of four miles to one inch; and he took over to his staff Mr. P. Doran, the fossil-collector of the Ordnance Survey. Among those geologists who had helped Portlock, Thomas Oldham and G. Du Noyer may be specially mentioned. Both served later on the Geological Survey of the United Kingdom, the former becoming, in 1850, Director of the Geological Survey of India, while the latter long enriched the Irish publications by his exquisitely appreciative drawings from nature, the originals of which are now sought after by artistic connoisseurs.

Fig. 2.



The Needles Rocks at Howth. Quartzite resting on porphyritic basic lava. From a sketch by G. Du Noyer. (Memoir of Dublin district).

In 1844, the Government transferred the official geological work, both in Ireland and Great Britain, to the Office of Woods and Forests, Sir Henry T. De la Beche becoming “Director-General of the Geological Survey of the United Kingdom.”† Portlock’s geological collections thus became lodged in the Museum of Irish Industry, now the Royal College of Science, Dublin, where a number of the historic specimens still remain. Chemical and other investigations into soils were carried on here for some years. Captain (later Sir Henry)

**Transfer to Woods  
and Forests  
Office, 1844.**

\* Portlock, “Report on Londonderry, &c.,” p. vi.

† J. B. Jukes, “Her Majesty’s Geological Survey of the United Kingdom.” An address at the Museum of Irish Industry, Dublin (1867), p. 6.

James was appointed Local Director for Ireland, and was succeeded by Thomas Oldham, in 1846,\* J. Beete Jukes being transferred to the post from England on Oldham's appointment to India in 1850. The geological work was placed under the Science and Art Department in 1853.

The great development of the Irish branch coincides with the nineteen years during which Jukes exercised control. On his death, in 1869, his successor, Prof. Edward Hull, completed the first detailed survey of the north of Ireland, and, by 1890, had the satisfaction of seeing a map and explanatory memoir supplied for every area throughout the country. The local Directorship was then abolished, and the late Mr. J. Nolan was placed as "Senior Geologist" in charge of a greatly reduced staff. It was wisely held that "a small staff must be retained in Ireland in order, first of all, to complete map, memoirs, sections, and other office work, to make the revisions that have become absolutely necessary on maps published many years ago, and generally keep the maps up to date."†

In fact, the first part of the survey under Jukes was pushed forward at a rapid rate. Ireland had been placed early in possession of topographical maps, on the scale of six inches to one mile, and on these were set aims of the Survey. down a number of details exhibiting the relations of rock-masses to the surface-features. Contouring was introduced in the north-west by Colby and Larcom, and the sheets of the county of Donegal, for example, far surpass in completeness and finish any similar work that is being issued at the present day. These six-inch maps served as a basis for the work of the Geological Survey; and Jukes was often obliged to delay publication until the corresponding one-inch maps were issued by the Ordnance Office. The later work, which came under the guidance of Prof. Hull, included areas of increasing geological complexity; and the "completion" of the map on the one-inch scale, in 1890, while it supplies us with a sound basis, necessarily leaves many problems for detailed revision, as scientific knowledge proceeds. Sir Archibald Geikie's references‡ to new discoveries

\* Sir A. Geikie, "Summary of Progress of the Geological Survey for 1897" (1898), p. 9.

† "Report of Director-General of Geological Survey for year 1889," "Ann. Rep. Sci. & Art Depart., 1890," p. 293.

‡ "Ann. Report of the Geol. Survey for 1893," Rep. Depart. Sci. and Art, 1894, p. 270.

made in the wilder parts of Mayo in 1893 afford an excellent

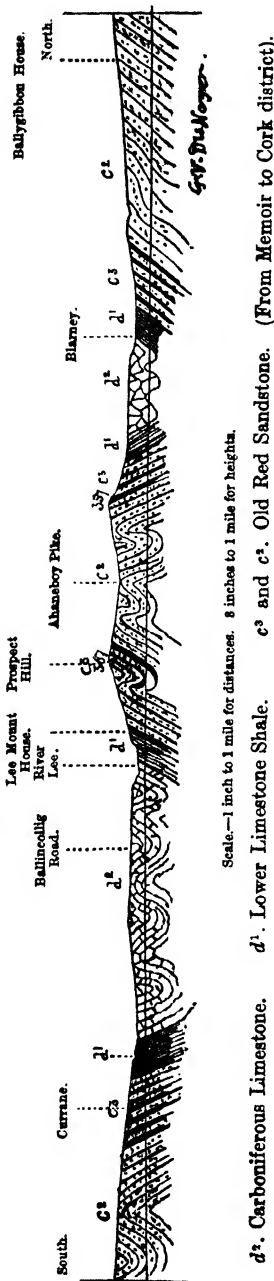
illustration; while the results of recent borings in the Kilkenny coalfield have necessitated changes on the one-inch map, under the care of Mr. McHenry, M.R.I.A. within the present year. From its two points of view, the educational and the industrial, it will be admitted that a geological survey must always be alert, well-informed, progressive. Its officers are scientific men, devoted to a life in which research and discovery are the fundamental aims; and it has always been a matter of regret that the superior recognition of such work by our Colonies has drawn off, from time to time, some of the best geological talent in our islands. Sir Andrew Ramsay,\* when Director-General, quoted several such cases, and pointed out the desirability of endeavouring to retain on the home-surveys the men who had gained experience, and who were the most proficient in their duties.

The practical applications of investigations carried on by a geological survey are by no means generally understood. There still exist mining engineers who are apt to judge of the mineral capacity of a district by a sort of rule-of-thumb comparison with some other district in which their operations have been successful. This is notably the case where boring for coal is undertaken. The geological surveyor does not

pretend to point out the very best position for a shaft,

\* Ann. Rep. Geol. Survey for 1857, p. 11.

**FIG. 3.**  
Section illustrating general structure of the country near Cort.



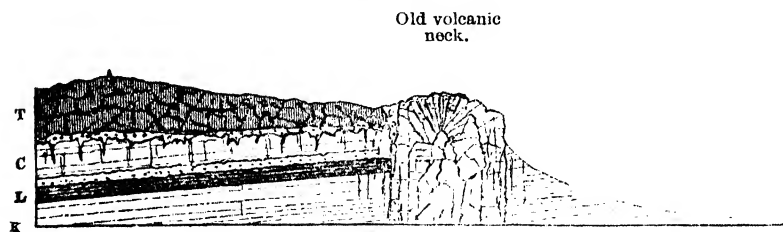
Scale.—1 inch to 1 mile for distances. 8 inches to 1 mile for heights.

*d*<sup>2</sup>. Carboniferous Limestone. *d*<sup>1</sup>. Lower Limestone Shale. *c*<sup>3</sup> and *c*<sup>2</sup>. Old Red Sandstone. (From Memoir to Cork district).

or to advise on technical questions of engineering; but his knowledge of rocks would prevent a bore-hole being put down

Fig. 4.

Section through old volcanic neck of Carnmoney Hill, illustrating general structure of the country near Belfast.



T. Lower basalt.

C. Cretaceous beds.

L. Lower Lias.

K. Triassic marks.

(From Memoir to Belfast district).

the pipe of an old volcano, as was done in the county of Antrim, or through beds of far higher antiquity than those in which productive coal occurs, as was the case in the black shales of "Coalpit Bay," in County Down, and many other places known to unhappy capitalists. In the latter instance,\* the correct determination of the strata depends on some of the most delicate studies of fossil forms; and in all cases, the correct grouping of the beds can only be gauged after detailed mapping, mile by mile. Boundaries between stratified series often remain conjectural, owing to their being concealed by superficial deposits, such as peat or sand; while the discovery of a new fossiliferous band may sometimes introduce a whole new reading of a district. It is a common relaxation for our younger geologists to detect errors in the maps of published surveys; but the hardened surveyor will accept with pleasure the discoveries that accelerate the inevitable revision. The main plan has been conscientiously laid down by many workers, whose aim was consistent and in common, but whose powers and opportunities have varied from time to time. To assert that a map, because published, is "complete" for all time would leave us in the position of a student of history who should rest content with Holinshed or Giraldus.

\* See Swanston, "Silurian rocks of the county Down," Proc. Belfast Nat. Field Club, 1876-7, p. 108.



While the so-called "solid geology" was being represented on the maps in Ireland, it early became obvious that the superficial deposits, the clays and gravels, for instance, that result from the weathering of the underlying, or even, of distant, rocks, were worthy of the surveyor's attention. While questions of mineral production, building-stones, or water-supply on a large scale, usually depend upon the masses beneath the soil, it is the soil itself, or at any rate, the subsoil, that appeals to the ordinary dweller on the surface. The agriculturist, in particular, may find himself dealing with a stiff clay, or with a hummocky surface formed of gravel-mounds, and yet is confronted with a geological map showing his whole area to be occupied by limestone. We have seen that the more conspicuous of the superficial deposits were marked on the map of Londonderry in 1837; and Prof. Jukes, in 1856, at the instance of Mr. J. B. Doyle, of Dublin, arranged to show the gravel-covered areas throughout Ireland by a series of engraved dots placed over the colours which indicate the fundamental rocks.

This system, however, proves insufficient for the true understanding of the country from an agricultural, and, indeed, from an educational, point of view. In England, what are called "drift maps" followed in due time on those showing the "solid" rocks; and in 1901 Mr. G. W. Lamplugh, F.R.S., who was exceptionally well acquainted with the characters and modes of origin of superficial deposits, was appointed District Geologist in Ireland, with a view to preparing an adequate "drift" survey of the country. By an arrangement with the Board of Education, economic geological enquiries were thenceforward to be dealt with by the officers of the Department of Agriculture and Technical Instruction, and no revision of the "solid" geology was to be undertaken by the Survey. It is obvious that this arrangement was intended to facilitate, with the small staff available, the progress of the drift-survey; but, if continued, it would have left the Irish Geological Survey increasingly behind the times when compared with those of other European nations.

The drift-survey under Mr Lamplugh, Mr. J. J. H. Teall, F.R.S., being Director-General, has produced the most complete and satisfactory maps of the areas round Dublin, Belfast,

and Cork, the basis being the revised Ordnance Survey maps, on the scale of one inch to one mile. The Limerick sheet is, moreover, now ready for engraving. The maps are printed in colours at the Ordnance Survey Office, and are sold at the moderate price of 1s. 6d. each. An illustrated memoir, costing 3s., accompanies each sheet, and the dwellers in or around the great Irish towns have thus been provided with what are, perhaps, the most effective and elaborate representations issued to illustrate the structure of any part of the British Isles. On the transfer of the work to the Department of Agriculture for Ireland, it was naturally proposed to continue this mapping of superficial deposits in the more important areas, and even to supplement it where desirable by detailed work in the form of "soil-maps." The latter, however, should probably be limited to districts of special agricultural interest, as may seem advantageous from time to time. While the drift-map represents the deposits of which the agriculturist can avail himself, a soil-map can exhibit local variations in these deposits, and may even take into account the results of long-continued tillage or other human treatment. It is clear that such work cannot be adequately and efficiently carried out except in conjunction with the Agricultural Branch of the Department.

It will be remembered that the pioneers, Colby, Larcom, and Portlock, established at the outset "a laboratory for the examination of soils." This work, which seems in

**A Soil-Bureau.** these latter days to be a natural part of a Government survey, placed the Irish organisation in 1837 in the forefront of scientific investigation. The scheme was, unfortunately, regarded by the authorities as either immaterial or inopportune, and it was left for Germany, the United States, Japan, and other nations, to develop agricultural geology as a branch of organised research. In connection with the recent drift-survey, however, chapters on the soils, by Mr. J. Kilroe, were introduced into the memoirs from 1901 onwards, the early and long-obscured traditions of the Survey becoming in this respect revived.

The present staff of the Survey, in addition to the economic geologist attached to the Department, may be regarded as forming, under the chief officials of the Department, a bureau for the supply of geological information respecting Ireland, and for the investigation of her natural features and resources. The Survey has

received a splendid heritage from the labours of the past seventy years. As we have pointed out, a geological map now

### Maps and Memoirs.

exists, showing, according to the knowledge gained at various dates, the fundamental structure of every district, on the scale of one inch to one mile. An explanatory

memoir, with notes on the history of mines and useful minerals, has been issued to accompany each sheet of this map. The original notes of the surveyors on the six-inch maps are preserved in the Office, in Hume-street, Dublin, under the care of Mr. R. Clark, Superintendent of Maps, and are accessible to the public when any special enquiry is on foot. Such enquiries, moreover, by introducing new observations or discoveries, may point out the desirability of fresh investigation and revision. The col-

### The Museum Collections.

lections of rocks and fossils made during the progress of the Survey are displayed in a special gallery of the Museum of Science

and Art, in Dublin, where the ingenious and effective arrangement of the specimens by the curator, Mr. H. J. Seymour, F.G.S., has provided for new additions, and yet secured a harmonious grouping in the cases. The Senior Geologist, Mr. S. B. Wilkinson, who has returned to the Irish staff after years of work in England and in Scotland, is at present conducting a detailed survey of the area round the city of Londonderry, where it is hoped that a combination of the drift-observations with a revision of our knowledge of the fundamental rocks may lead to results of which Larcom and Portlock would have approved.

Lastly, we may lay further stress on the educational aspect of the Geological Survey, especially in connection with the work of agricultural and secondary schools. It has

### Educational aspects of the Survey.

been felt again and again that the publications of the Survey have been too little known; but the present progress in the cul-

tivation of scientific studies in Ireland must lead to a more just appreciation of what has been done towards the understanding of the country. Nearly half a century ago, Jukes wrote\* :—"Our work is intended for the future rather than the present. The public must become more generally acquainted with geology before a general interest will be taken in our publications as a means of intellectual instruction and recreation. Their practical value will

\* Ann. Rep. Geol. Survey of the United Kingdom for 1880. p. 5.

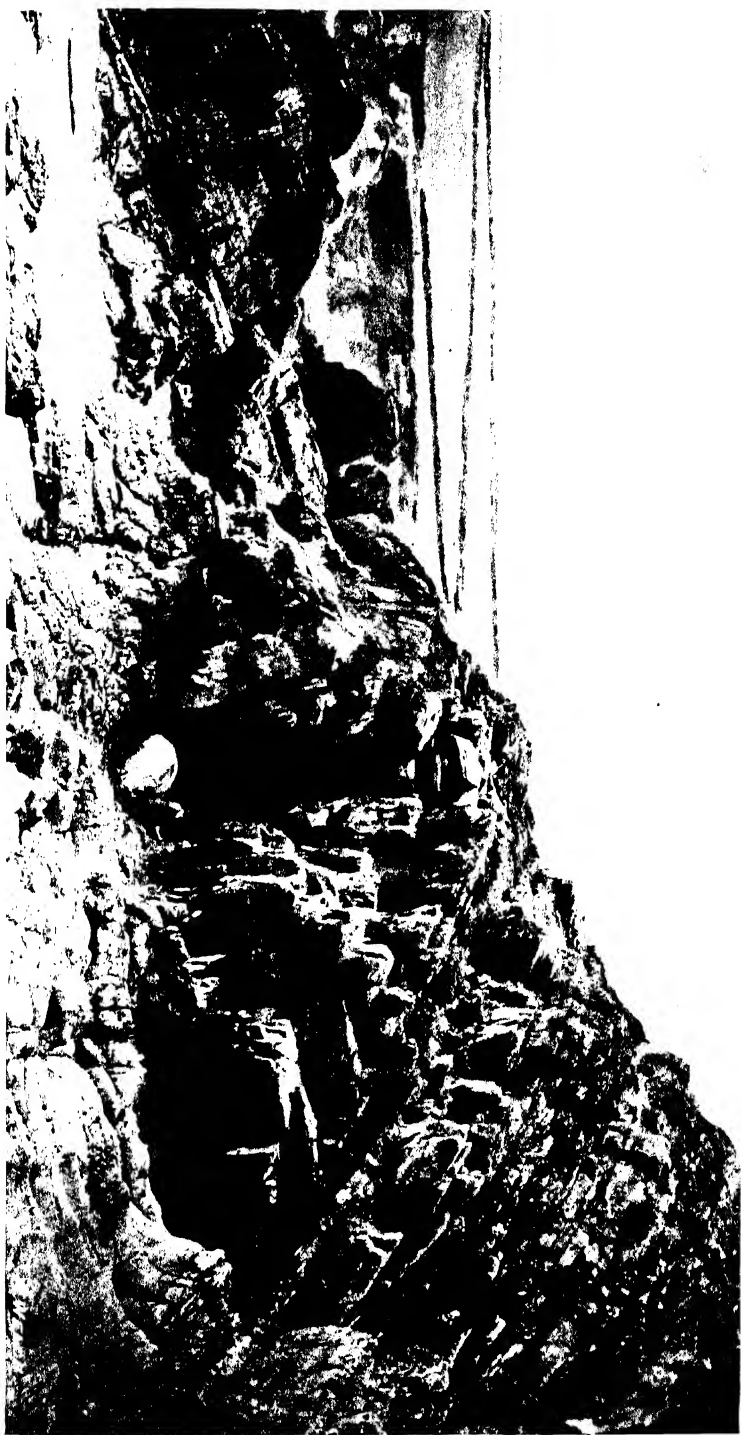


Fig. 5.—Folding of the rocks of southern Ireland. Anticline in clefted Old Red Sandstone, on the coast 300 yards S. S. W. of Weaver Point, Co. Cork. (From memoir of Cork district.)



in like manner only be fully appreciated when the public in general understand their use. . . . At present their very existence is not known to many persons, who would be glad to possess them, so that I have no doubt that the sale would be largely increased by a wider and more general system of advertisement."

In those days, Prof. Jukes, in an annual series of lectures in the Royal College of Science for Ireland, many of which were open to the public, placed his wide geological experience at the service of



FIG. 6.

*Oldhamia antiqua*, Bray Head, Co. Wicklow, representing what are probably the oldest remains of life-forms in Ireland. (From Memoir of Dublin district).

education; and the same practice was continued during the twenty years in which Prof. Hull filled the office of Director. The importance of the Survey as an educational agent becomes greatly increased by the fact that the Royal College of Science now sends out, year by year, students trained for teaching, often in rural districts, and all possessing some knowledge of geology—that is, possessing some knowledge of the long and fascinating history which has given us the rock-set slopes and wooded valleys, the broad white waters of the plain, and the dark pools among the mountains, which we sum together in our thoughts and speech as Ireland.

GRENVILLE A. J. COLE.

## THE LINEN TRADE AND ITS RAW MATERIAL.

The manufacture of linen is carried on extensively in two districts in the United Kingdom, namely, in

**Linen Industry**      the North of Ireland, and in the East of  
in United Kingdom.      Scotland. In both districts the industry  
has attained very large proportions, and  
'Irish' and 'Scotch' linens have now a world-wide reputation. The  
linen industry occupies the third place in importance in our textile  
industries, the total value of linen manufactures exported from the  
United Kingdom for the year 1904 amounting to £5,727,054.

**Flax**, which is the 'raw material' of the industry, was formerly  
grown in large quantities in the United  
**Decrease in Irish**      Kingdom, more particularly in Ireland,  
**Flax-Growing.**      where, at one time, it was cultivated to such  
an extent that, besides supplying the de-  
mands of the home industry, a considerable quantity was exported.  
During the last fifty years, however, the cultivation of flax has  
gradually declined, and at the present time Ireland only provides  
about one-fourth of the supply of flax required by Irish spinners.

IRELAND.		
Year.	Statute acres under Flax.	Yield in Tons.
1864, ... ..	301,693	64,920
1904, ... ..	44,292	9,341

The decline in flax cultivation is not confined to this country.

**Decreased**      In Germany, France, Austria, Belgium, Italy  
**Cultivation in some**      and Holland the area under flax has been  
**other Countries.**      much reduced. Hungary would appear to  
be the only country besides Russia where  
the cultivation of flax has increased.

The Russian flax-growing industry has assumed enormous proportions.

**Great Increase  
in Flax  
Cultivation in  
Russia.**

RUSSIA.		
Year.	Acres under Flax.	Production of Flax.
1885, ... ..	3,250,000	Tons. 330,000
1895, ... ..	5,480,000	670,000 (Mulhall.)

The amount of flax exported from Russia has also greatly increased:—

RUSSIA.				
Year.				Export of Flax.
				Tons.
1824-6,	...	...	...	34,679
1848-50,	...	...	...	68,158
1884,	...	...	...	178,620
1889,	...	...	...	224,791

It would appear that the cultivation of flax tends to drift from Western Europe to Russia, where cheap labour can be obtained, and where there are large areas of land suitable to the growth of this crop. No doubt other countries will continue to grow a certain limited amount of flax of a better quality than is usually produced in Russia, but the production of flax is shifting to the country where the cost is lowest. It will be seen from the following table, for the year 1902, that Russia supplies almost 80 per cent. of the total flax produced in Europe.

Flax Production in Europe, Year 1902.					
				Tons.	Tons.
Russia (including Poland),				—	510,841
OTHER COUNTRIES.					
Austria,	...	..	...	50,669	—
France,	...	...	...	15,812	—
Italy,	...	...	...	20,000	—
Germany,	...	...	...	11,250	—
Belgium,	..	...	...	9,197	—
Ireland,	...	...	..	10,975	—
Hungary,	...	...	...	12,199	—
Holland,	...	...	...	8,552	—
Roumania,	..	...	...	7,021	—
Various Countries,	...	...	...	3,000	—
Total for Europe,				—	149,769
					660,110

The linen industry in the United Kingdom now occupies much the same position in regard to the supply of Foreign Flax used its raw material, as does the great cotton in the Linen Trade. industry of Lancashire, for these industries are dependent on foreign countries for the supply of flax and cotton respectively.



The following table gives the quantity and value of the raw material (flax, tow, etc.) imported into the United Kingdom during the year 1904:—

Imports of Flax and Tow, or Codilla, into the United Kingdom.					
From—				Year 1904.	
				Quantities.	Value.
FLAX.				Tons.	£
Russia, ...	...	...	...	39,660	1,523,706
Belgium,...	...	...	...	17,494	1,094,987
Holland,...	...	...	...	3,415	171,442
Other Countries,	...	...	...	1,445	46,126
TOW, OR CODILLA.					
Russia, ...	...	...	...	7,423	233,259
Other Countries,	...	...	...	5,480	115,556
				74,917	3,185,475

It will be seen from the above table that Russia supplied 47,083 tons of flax and tow, or cordilla, *i.e.*, almost two-

**Russian Flax  
Provides a Cheap  
Raw Material.**

thirds of the total of 74,917 tons imported. Russian flax is a very necessary article to the linen industry of the United Kingdom, being very largely used in the Scotch and also in the Irish industry for the production of the lower qualities of linens. Compared with flax from France, Belgium, or Holland, Russian flax is poor in quality, but its price is correspondingly lower.

Average cost per ton of Flax used in the Linen Trade of the United Kingdom.					Year 1902.	
—						
					£	
Belgian, ... ..	...	...	...	...	64	
Irish, ... ..	...	...	...	...	50	
Dutch, ... ..	...	...	...	...	49	
French, ... ..	...	...	...	...	44	
Russian, ... ..	...	...	...	...	37	

The United Kingdom is Russia's largest customer for flax, and Imports of Flax, &c., takes between 30 and 40 per cent. of the total from Russia. quantity exported.

The following table gives the quantities and value of Russian flax imported into the United Kingdom for last six years:—

Imports of Flax and Tow, or Codilla, into the United Kingdom from Russia.				
Year.			Quantity.	Value.
			Tons.	£
1899.	...	...	73,379	1,942,512
1900.	...	...	75,814	1,548,569
1901.	...	...	52,081	1,051,733
1902.	...	...	46,580	1,655,008
1903.	...	...	68,471	2,356,234
1904.	..	...	47,083	1,756,905

In so far as there is an entire absence of gambling in 'futures,' which has so demoralised the Lancashire trade, the conditions under which the business of the supply of flax for the linen industry is conducted present a very healthy contrast to those which prevail for the supply of raw cotton for the cotton industry. Unfortunately, however, the flax trade labours under a difficulty of another kind. It is to be regretted, in dealing with Russia, that Official Statistics are not available at a time when they would be of practical use to those engaged in the linen business. Of flax-producing countries Russia is the one of which least is known, because, owing to its extreme type of Continental weather, an uncertainty always exists as to the result of the crop. Long spells of drought on the one hand and of rain on the other often injure the flax. The retting operations during the autumn are liable to interruption from the setting in of an early winter, and the prospects of a good crop have sometimes been completely nullified owing to the prevalence of unfavourable climatic conditions during the retting process. It is by no means an uncommon experience in Russia for flax to be 'snowed' that is, covered with snow while spread on the fields, and it has often to remain in this state until the snow melts in the spring. Retting operations, too, have often to be put off until the spring so as to secure more favourable weather. The Russian flax markets depend for their supplies on the existence of sledge roads, which are often impracticable, and on river communication, which, unfortunately, sometimes closes early in the season. The closing of the Baltic navigation in winter is also a factor, which is of serious moment to the export trade.

**Uncertainty  
regarding Russian  
Flax Crop.**

The foregoing are some of the conditions which yearly tend to make the supply of flax uncertain, and, in addition to these, there is always the possibility of the area under this crop being either increased or reduced by some hundreds of thousands of acres.

The absence of official estimates or reports as to the crop affords an opportunity for the circulation of all kinds of alarmist rumours, and there is usually an annual crop scare. We are sometimes told that the crop is a large one when the contrary is really the case, or that it has been completely ruined by the conditions of the weather, when the injury may be insignificant. *The Linen Market*, the weekly organ of the linen trade, referred to this subject in its issue of 1st November, 1902, as follows:—"We do not remember a time when the result of the coming Russian flax crop was looked forward to with such absorbing interest. It is a pity that it seems so difficult, almost impossible, to get any reliable information about what one would think should be a simple matter, for until this is definitely known, yarn prices are likely to suffer more or less from suspense and doubt." The importance of both accurate and reliable information as to the supply of flax is of the utmost importance to those engaged in the linen trade.

The cultivation of flax for its fibre may be said to be confined entirely to Europe, the only exception to **European Flax Crop**, this being that it is now produced to a certain extent in Siberia. Outside Europe it is cultivated for its seed.

The following table, compiled from the statistics of the Flax Supply Association, gives the figures of the European flax crop for years 1899 to 1902:—

EUROPEAN FLAX CROP.

—	Statute Acres.			
	1899.	1900.	1901.	1902.
Russia, ... ..	2,361,204	3,705,800*	3,734,338	3,788,197
Austria, ... ..	171,005	177,067	177,156	176,614
France, ... ..	43,457	52,512	62,076	55,080
Italy, ... ..	128,000*	128,000*	128,000*	129,310
Germany, ... ..	90,000*	83,147	70,000*	60,000*
Poland, ... ..	80,000*	80,000*	79,958	80,000*
Belgium, ... ..	56,774*	49,928	49,983	47,473
Ireland, ... ..	34,989	47,451	55,442	49,742
Hungary, ... ..	45,425	45,497	44,554	40,861
Holland, ... ..	19,760	28,246	32,097	33,836
Roumania, ... ..	51,524	32,735	51,666	102,117
Other Countries,† ...	20,000	20,000	20,000	20,000
	3,102,138	4,450,383	4,505,249	4,582,940

\* The figures have been given by the Flax Supply Association for these years for which must be taken as an approximate estimate.

† The figures under the head of "Other Countries," are merely an estimate.

## EUROPEAN FLAX CROP.

	Yield of Flax in Tons.			
	1899.	1900.	1901.	1902.
Russia, ... ..	185,703	275,000*	310,527	497,341
Austria, ... ..	41,090	49,518	54,567	50,659
France, ... ..	12,423	19,103	24,404	15,812*
Italy, .. ...	18,400*	18,400*	18,400*	20,000
Germany, ... ..	16,875*	15,590*	13,125*	11,250*
Poland, ... ..	13,500*	13,500*	13,323	13,500*
Belgium, ... ..	11,000*	10,919	9,674*	9,197*
Ireland, ... ..	6,743	9,479	12,797	10,975
Hungary, ... ..	9,257	9,814	9,853	12,199
Holland, ... ..	4,902	6,751	8,275	8,552
Roumania, ... ..	3,690	5,965	9,393	7,625
Other Countries,† ...	3,000	3,000	3,000	3,000
	326,483	437,039	487,368	600,110

\* No returns have been given by the Flax Supply Association for these years, the figures for which must be taken as an approximate estimate.

† The figures under the head of "Other Countries," are merely an estimate.

The low prices prevailing for flax, prior to the year 1900, had, undoubtedly, the effect of reducing the area

**Linen Trade, Year 1899.** under this crop, and it would seem that most of those engaged in our linen industry were unaware of the extent of the diminished

supplies. The poor flax crop of 1899 and the higher prices demanded brought about a crisis in the flax trade, and at the close of the year some qualities of Riga flax had advanced almost 100 per cent. in price. Russian flax markets were wild with excitement, as no one knew exactly the extent of the shortage in flax. The rise in prices unfortunately led in some instances to litigation regarding the fulfilment of contracts between British firms and certain sellers of flax in Russia.

Throughout the year 1900 the trend of prices was in an upward direction. Quotations fluctuated from

**Linen Trade, Year 1900.** month to month. Unheard of prices were demanded by foreign flax-growers, and as the year advanced the lack of orders at the

higher rates forced manufacturers to curtail production. A number of firms in the spinning, weaving, and finishing branches of the trade were obliged to have recourse to short time.

The first half of the year 1901 saw prices, with some slight fluctuations, on a still higher level, rates

**Linen Trade, Year 1901.** advancing smartly as much as £3 to £5 per ton. According to Consul-General Murray's

report in April, 1901, the 1900 flax crop in Russia turned out inferior in both yield and quality to that of the previous year, although it had been reported that its area was 15 per cent. greater than that of 1899. The effect of the abnormal rise in prices was disastrous to the linen trade. Manufacturers could not obtain equivalent prices for their goods, machinery was lying idle, and mills were working on short time. Towards the autumn an acute stage was reached in the struggle between holders of flax in Russia, who demanded extreme prices, and our flax-importing houses, who were quite unable to pay exorbitant rates. The inevitable reaction came, prices falling as much as £17 per ton from the top figures for some grades. These violent fluctuations in prices brought about a crisis in our linen trade, which resulted in the failure of a few firms.

As regards flax 1902 was a most unsatisfactory year. Russian dealers kept advancing their quotations, and

**Linen Trade, Year 1902.** obtained advances ranging from £3 to £5 per ton in the month of June on develop-

ment of short supplies. The produce of the new crop at first made at very high prices, but the Russian dealers began to press sales. As the autumn advanced the pressure to sell became more severe, and prices fell some £7 to £8 per ton for certain varieties. It was reported that the Russian flax crop of this year (1902) was very large, and the great uncertainty as to future prices acted as a drag on our linen industry. No one cared to purchase flax until there was available more reliable information as to the reported increase in the crop, when a more definite opinion might be formed as to the figures to which prices for the new crop would probably fall.

All calculations as to cheaper prices based on the reported larger crop of 1902 were upset. Prices of flax

**Linen Trade, Year 1903.** again began to rise in January, 1903, and, with the exception of some slight fluctuations, continued to advance throughout the

entire year. The prices of flax in December, 1903, were higher than at any time within the recollection of the present generation.

The extent of the advance will be seen from the following quotations for a couple of varieties of Russian flax at the beginning and close of the year 1903:—

Prices quoted (per ton) for two varieties of Russian Flax.				
Date.		Livonian, Basis K.		Pernau, Basis D.
		£	s.	d.
1st January, 1903,	...	23	10	0
31st December, 1903,	...	33	5	0

The year opened with flax prices at their highest figures. With a slight falling tendency very high prices ruled till September, when a further decline occurred, and the year closed with prices on a still lower basis. The following table gives the quoted prices for two varieties of Russian flax at the beginning and end of the year:—

Prices quoted (per ton) for two varieties of Russian Flax.				
Date.		Livonian, Basis K.		Pernau, Basis D.
		£	s.	d.
1st January, 1904,	...	33	5	0
31st December, 1904,	...	26	0	0

The advance in the price of flax, which commenced in 1899, reached its highest point at the close of 1903.  
**Disastrous Effect of High Prices.**

Table showing prices of three varieties of Russian Flax in years 1899 and 1903.				
Date.		Livonian, Basis K.		Yaropol Seretz, 1st sort.
		£	s.	d.
24th January, 1899, ...	...	14	7	8
31st December, 1903,	...	33	5	0
Total advance,	...	131%		95%

As the price of flax advanced, the depression and lack of demand for linen manufactures became more accentuated, and production was still more curtailed. A considerable proportion of machinery was almost everywhere lying idle, and short time was being worked in all branches of the linen trade. The extent of the depression can be seen from the following table:—

Exports of Linen Manufactures from the United Kingdom. Years 1899-1904.		
Year.	Linen Yarn.	Linen piece Goods.
	Lbs.	Yards.
1899, ... ..	18,152,400	174,279,000
1900, ... ..	16,361,800	154,800,100
1901, ... ..	12,971,100	150,215,300
1902, ... ..	14,370,400	163,128,600
1903, ... ..	14,092,300	154,877,800
1904, ... ..	14,758,100	161,550,600

The crisis brought about by the advancing prices of flax proves how disastrous to the trade is the high price of raw material. When the price of flax is driven beyond a certain limit, demand turns to a cheaper article, which is used as a substitute for linen.

A. L. CLARK.

## THE CARE OF MILK FOR CREAMERIES.

The secret of good butter-making is cleanliness; the secret of bad butter-making is uncleanness, or dirt. If good butter is to be made, the secret must be remembered from the beginning of the process to the end—from the cow to the table.

Uncleanliness or dirt means not only such visible things as straw, fodder, manure, earth, sand and dust, but also the invisible taints which these leave behind when they are removed from the milk by the strainer. Visible particles may be removed from milk, but their invisible taints may not. Dirt and taints in milk have the same significance as dirt and taints in a wound: if they are present neither the butter maker nor the surgeon can hope for success. To ensure success in butter-making it is, therefore, necessary that the milk be clean and pure; and to accomplish this it must be kept free from every conceivable contamination, visible and invisible.

It is to the interest not only of the creamery and its officials, but also of every supplier of milk, that the utmost cleanliness be observed; and not only by the officials and suppliers as a whole, but by every one of them individually. A single slip may contaminate a day's "making"; a constantly careless supplier or official will contaminate a whole season's "making." And, unfortunately, the careless individual does not suffer alone: he brings discredit and possible loss upon every one connected with the creamery. It is doubtful, indeed, whether a creamery is considering its own and its suppliers' interests when it admits a single sample of milk about which there may be the slightest suspicion.

The following are the chief sources of contamination:—

- (1.) The byre or cowshed. ,
- (2.) The cow.
- (3.) The milker.
- (4.) The milk store, or place where the milk is kept till sent to the creamery.
- (5.) The milk cans.
- (6.) The cleaning utensils, water, &c.



In connection with each of the above-mentioned sources of contamination the following rules should be observed:—

The inside of the byre should be thoroughly cleaned once a year at least. At the same time the walls, roof

**The Byre or Cowshed.**

and rafters should be whitewashed. The floor of the byre should always be clean.

The manure and soiled litter should be removed from the byre at least twice every day. The cow should be milked before any operation likely to raise dust in the byre has taken place.

A well-constructed byre should have smooth walls, with no cracks or crevices; the stall should be so long that the manure drops into the gutter behind the cows; the floor should be hard and even, preferably of such material as scored concrete, so that it can be easily swept and swilled out.

Cows in the house should be groomed every day. They should be kept even cleaner than horses. Special

**The Cow.**

care should be taken with the udder and surrounding parts. The udder should be

wiped with a damp cloth before milking. The tail should be kept clean, and it should be held or tied during milking. Cows on the grass should be groomed if they become dirty or dusty about the udder or hind quarters.

The milker's arms should be bare to the elbow. The hands should be clean and the nails short. The

**The Milker.**

milker should milk with moist, not wet, hands, and the milk should never come in

contact with the hands. The first few jets of milk from each teat should be rejected. Should the hands become dirty during milking they should be washed; careful milkers wash their hands after they have done with each cow.

When a cow has been milked, the milk should be strained from the milking pail into the larger receiving-

**The Milk during Storage.**

can. A good strainer is formed by a few folds of fine butter muslin or a piece of clean flannel laid lightly over the mouth of

the large cans. After use the strainer should be thoroughly cleaned and then laid out to air and dry. The mouth of a milk can should

always be covered either with the strainer or with its own lid, and the can should be set where no dust taints can be carried to it from a road, byre, manure heap or other source of contamination. If the milk is not to be taken to the creamery at once, then it should be set in a clean and cool place, free from dust.

In summer the milk cans should be set in cold water. If the water is not cold enough a clean cloth, with its lower end dipping into the water, should be wound lightly round the can. On no account should milk intended for a creamery be kept at the farm for more than twelve hours.

All milk cans and pails should be of tinned steel, and, in order that they may be properly cleaned, they

**The Milk Cans.** should be so made that every part can be seen and reached, and all cracks or crevices should be filled up with solder. All seams should be well made and filled up with the same material. The best cans are now made of one piece of steel without seams. Milk cans and pails should first be scrubbed and washed out with cold or tepid water, then swilled with cold water, and, finally, scalded out with boiling water or steam. Then they should be sent out to drip and dry in such a position that no dust can enter.

If the cans have bad seams, these must be cleaned out with great care. They should be picked out with a splinter of white wood or bone before beginning to clean the can. The cleaning of milk cans should never be delayed a moment after they are empty.

It would be a very great advance indeed if one daily cleaning of milk cans could be undertaken by the creameries, where power and steam are both at command; not only the cans going back to the farms empty, but those going back with skim milk or butter-milk as well.

All the water in use for dairy purposes should be clean and fresh, preferably from a deep well sunk clear

**Water and Cleaning Utensils.** away from such sources of pollution as dung heaps, pig styes, cattle pools, &c. The brushes, cloths, tins, &c., used in cleaning

should first be well washed out in cold or tepid water, then in hot water and soda, and finally in boiling water or steam. They should then be set out to dry and sun on a hedge or fence away from

dust. It would be useless for a creamery to clean the milk cans if they were to be "cleaned" again at the farm by dirty brushes and cloths.

It cannot be too clearly realized that the success of a creamery depends not only upon the suppliers and creamery officials as a whole, but upon every supplier and official individually. A single careless individual may bring discredit and loss upon all the others. It is, therefore, every one's interest that all should work up to the same high standard of cleanliness and good workmanship. If a milk supplier sends in milk not up to the standard, then all the other suppliers should insist that his milk is rejected at the creamery. Milk which develops a bad taste or smell on standing, or which "cracks" or curdles on boiling is not fit to be received at a creamery. The milk suppliers should also insist that the creamery itself is up to the very highest standard of cleanliness and good order; not only in the processes leading up to butter-making, but even in the handling of the separated milk and buttermilk to be returned to the farmer.

*Copies of this article in leaflet form (No. 61) may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.*

## PLANS FOR CREAMERY BUILDINGS.

Many of the creameries in the country are seriously hampered in their work through being housed in badly designed buildings, or because the buildings are placed in unsuitable positions. The importance to the people engaged in the creamery industry of being able to carry on the work in buildings erected in accordance with well designed plans and on suitable sites cannot be over-estimated.

The mistake has frequently been made of endeavouring to fit machinery into a building which was not designed for its accommodation, with the result that the machines are so crowded together or inconveniently arranged that the premises cannot be kept in the state of cleanliness so necessary to the successful manufacture of the best butter.

The essential part of every creamery is the machinery, hence the building in which it is to be placed should be so designed as to cover the machinery immediately required, and permit of extension with the minimum amount of disturbance to the business. With this end in view the Department are now prepared to supply plans and recommendations for the guidance of proprietors and managers of creameries, architects or others, who may be called upon to design and superintend the erection, extension or alteration of a creamery, in order that a suitably constructed building, and one requiring the minimum amount of labour to keep it in a clean condition, may be provided. The plans, specifications, and quantities are not intended to supersede the work of the local architect who will have the supervision of the building operations, but rather to assist him in that work.

Some of the outside work outlined in the plans can be easily performed by the proprietors, thus reducing the amount of the building contract, but the work should be carried out on the lines recommended.

In no case is it advisable to erect even an auxiliary creamery unless the milk from 300 or 400 cows is assured and there is a good prospect of a supply of milk being received from 500 cows. With smaller supplies of milk the working expenses are too high, and it is cheaper to collect the milk by carts.

In working out the plans consideration has been given to the

**Plans.** following points:—

That there should be ample room, so that all tanks, machines, &c., may be placed clear of the walls and each other, that

the splashing of milk or milky matter on the walls will be avoided, and that the attendants can approach the machines on all sides for cleaning.

That there should not be any wood in such a position, or as a support for a machine, where splashing will take place.

That the floors are smooth and have sufficient fall. Iron stands should be used for supporting machines and tanks; concrete blocks should be avoided.

That the creamery is well lighted and ventilated. Dirt can thus be seen; and the creamery will dry quickly.

That the drains should have sufficient fall and be trapped outside.

That any passage or place where milk is liable to be spilled should be concreted, or suitably paved and drained.

Provision is made in all the plans for the erection of Pasteurising plant, and in the case of full creameries space is provided for the erection of a chilling machine and cold store.

The following four plans have been prepared in accordance with the above points:—

No. I.—For a separating station to treat any quantity up to 1,500 gallons of milk per day.

No. II.—For a creamery to treat any quantity up to 1,500 gallons of milk per day.

No. III.—For a creamery to treat from 1,500 to 3,000 gallons of milk per day and the cream from auxiliaries dealing collectively with 4,000 gallons of milk.

No. IV.—For a creamery to treat up to 4,000 gallons of milk per day and the cream from auxiliaries dealing collectively with 8,000 gallons of milk.

Before selecting any one plan a careful examination of the district should be made, and its milk-producing capacity in the height of the season estimated.

In all cases it is recommended that the power end of the buildings be placed within sixteen to twenty feet of one boundary, so that room for extension will be left at the other end.

Consideration should be paid to the following points when selecting the site on which the creamery is to be erected:—

That there is an ample supply of good water available from a well, or a well supplemented by a clean river supply. The

daily quantity of water required will be at least three times the largest quantity of milk expected on any one day. The well should be sunk in a position which a careful examination has shown to be free from possible sources of contamination; and a chemical and bacterial examination made of the water to test its suitability for dairying purposes. Clean river water may be used for cooling and supplying the boiler. Should the whole supply of water be from a well, then it should be ascertained if the quantity of water available will be sufficient before proceeding with the building of the creamery (see page 646).

There should be a fall from the creamery of at least 10 feet in 200 yards, and in a direction away from the public road or habitations, in order that the sewage may be disposed of. It may also be desirable to secure a right of way to, and option of purchase of a small plot of land for the purposes of sewage purification.

The site should be convenient to a number of roads, preferably converging on the creamery. An examination of the Ordnance Survey map of the district will generally result in the finding of some such natural centre.

The creamery should not be so close to another as to interfere with the supply of milk to the latter; there should be a distance of at least six miles between any two creameries in an ordinary district—collecting carts can cover the intervening ground; and care should be taken that no natural obstacle, such as a range of hills, a bog or river, interferes with the convenient delivery of the milk supply from any direction.

A creamery should be close to a railway station or other means of despatching and receiving goods. It would also be a decided advantage to be within the delivery area of a telegraph office.

While it may not be possible to combine all these conditions, the site selected should include as many of them as possible, but, above all, a good water supply should be secured.

The plans may be turned right to left or back to front, in order to suit the site.

It is advisable to secure at least half an acre for Nos. I. and II., three-quarters of an acre for No. III., and one acre for No. IV. This will provide ground for a manager's house, and allow of a

screen of trees and shrubs between the main road and the creamery, thus lessening the dust and giving the place a tasteful appearance.

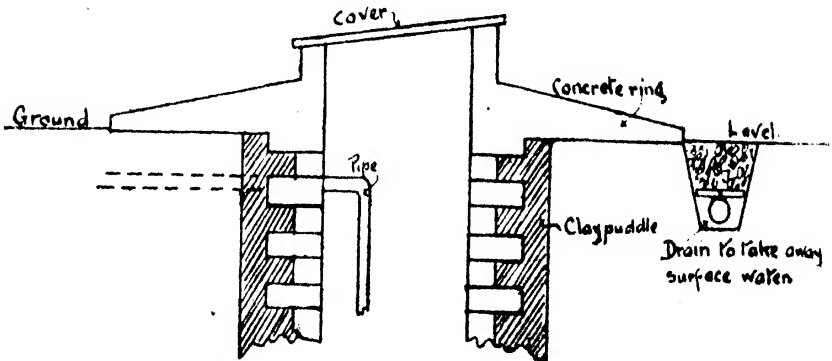
The grounds should be suitably laid out and planted. Trees and shrubs can be used to screen off the lavatory accommodation provided for the employées.

The well should be sunk at such part of the grounds that all sur-

**The Well.** face water will drain naturally from it.

It should be sunk to such a depth and should be of such diameter that the storage capacity, below the water level, shall equal the quantity of water required for the largest day's supply of milk likely to be received.

Whether the lining of the well be of brick or stone it should have a course every few feet, laid in cement to act as a strengthening ring, and should be well puddled behind with nine inches of clay to a depth of at least fifteen feet, as shown in sketch below. The upper portion of the well should be finished off in concrete carried two feet above the ground level, and provided with a strong cover with manhole. A wide concrete ring should be built round the top and drains provided to carry away any surface water.



Diameter and depth from surface of water to be such that there is ample storage capacity for one day's supply of water = 3 times maximum daily milk supply.

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## CEMENT MANUFACTURE IN GERMANY.

An article by Mr. Charles Spackman, F.C.S., on the manufacture of Portland cement appeared in the issue of the *Journal* for December, 1902 (Vol. III., No. 2, p. 221), and it was immediately followed (p. 249) by an account of the cement-making industry in the United States. In connection with these articles, and as cement-manufacture is an industry in some respects suitable for this country, the following account taken from a Consular Report\* prepared by the Consul-General at Hamburg regarding this industry in Germany will be of interest.

No branch of industry in Germany has experienced such a rapid expansion as the German cement industry.

The beginning of this industry in Germany only dates back to the year 1852. In that year the attention of several technical men in that country was directed to the presence on the coast of the Prussian province of Pomerania of the same kind of clay ("Septurien-Thon") as was used in the United Kingdom in the preparation of cement; and this discovery led, within a few months, to the establishment, on a small scale, of the first German cement works at Zülchow near Stettin. In these works the newly discovered clay was used, together with chalk found on the neighbouring Island of Wollin, for manufacturing cement, which was pronounced to be quite equal in quality to the well-known British Portland cement.

Two years later a second cement factory on a larger scale was started at Bonn on the Rhine, and in the year 1854 the annual production of these two factories is stated to have reached about 50,000 casks (of 374 lbs. each). A third factory was then built in 1854 in the Island of Wollin, and in the course of the next years gradually more cement works were erected in different parts of Germany. In 1882 there existed in Germany 420 smaller and larger factories of cement and cement goods, and the total output of cement by these works in that year is stated to have been 3,050,000 casks (of 374 lbs. each). In the year 1895, the annual

\* Cd, 2237-5-1905,



output had increased to 12,400,000 casks, whilst the number of cement works had increased to 1,136 larger and 138 smaller factories of cement and cement goods, in which altogether 29,896 persons were employed.

Of the 1,136 larger works, however, only 239 were employed in producing cement (and trass) used as a raw material for building purposes; whilst 897 works were engaged in the manufacture of cement goods, such as castings, plates, &c., the number of persons employed in these latter factories being 9,087, whilst 20,809 persons were employed in the cement works first mentioned. Wherever practicable the larger works have been erected, not merely in proximity to the deposits of the raw materials used for the cement manufacture, but also at the same time in localities where there is good water communication, and where, if possible, coal or other fuel is obtainable at a comparatively low price. The factories of cement castings, gypsum, &c., on the other hand, have for the greater part been established in the larger towns of this country, where these goods are in constant demand for local use.

With regard to the 239 cement works first referred to, it may be mentioned that in the year 1895 there were viz.:—

Number of Works.	Number of Persons Employed.		Total Number Employed
	From—	To—	
90, ... ..	1	5	209
71, ... ..	6	50	1,315
40, ... ..	51	200	4,334
38, — ... ..	—	Above 200	14,952

The largest number of German cement works are naturally to be found in Prussia, the chief centres of industry being situated in Westphalia and Hanover.

No official statistics of the number of cement and other industrial works, and the number of persons employed in different German industries, have been published since 1895, when the last industrial census was taken, so that no figures can therefore be furnished referring to more recent times. There can, however, be no doubt about the fact that the number of

cement works in Germany has largely increased during the last nine years, especially also as the present annual output of cement in that country is estimated at about 30,000,000 casks (of 374 lbs. each), or more than double the quantity produced in 1895. During the first years of the existence of the German cement industry the German product had considerable difficulty in competing in Germany with British cement, owing to the cheaper prices of the latter, which in many instances was able to be transported at lower rates of carriage from the United Kingdom to inland German markets, than were charged for transporting the German cement to such markets from the locality where it was produced. It was, moreover, at first difficult for the German manufacturer to convince the public in that country that many kinds of German cement were quite equal in quality to British. Gradually, however, the disinclination of the German consumer to use the home product disappeared, whilst the German cement works managed, by improving their methods of manufacture, and by erecting works in localities more favourably situated as regards water communication, to reduce their prices, and German cement was not only more and more used in Germany itself, but it gradually became also an important article of export from that country, and entered into serious competition with British cement in most foreign countries, and to a certain extent even in the United Kingdom.

As will appear from the following figures, the total quantity and value of cement exported from Germany in

**Exports of Cement.** the year 1895 already amounted to 470,000 tons, valued at 600,000*l.*, and these figures have respectively increased during the last nine years to 742,381 tons, valued at 906,050*l.* :—

Year.				Quantity.	Value.
				Tons.	£
1895,	...	...	...	470,000	600,000
1896,	...	...	...	477,000	820,000
1897,	...	...	...	524,557	900,000
1898,	...	...	...	551,744	1,000,000
1899,	...	...	...	580,255	1,360,000
1900,	...	...	...	600,386	1,270,000
1901,	...	...	...	660,612	921,000
1902,	...	...	...	699,378	999,800
1903,	...	...	...	742,381	906,050

The countries to which German cement is chiefly exported will be seen from the following table, which gives the figures for the three years 1901, 1902 and 1903, viz.:—

To—	1901.		1902.		1903.	
	Quantity.	Value	Quantity.	Value.	Quantity.	Value.
	Tons.	£	Tons.	£	Tons.	£
United Kingdom, ...	33,549	58,700	33,635	50,350	26,694	45,850
Belgium, ...	29,582	35,100	26,313	26,300	31,929	32,850
Denmark, ...	15,545	27,200	18,984	28,350	20,729	25,900
Netherlands, ...	89,097	113,600	108,649	127,450	123,202	134,550
Austria-Hungary, ...	21,068	36,750	17,355	25,900	23,590	28,350
British South Africa,	31,734	55,500	36,720	55,100	39,220	49,000
Brazil, ...	14,975	26,200	18,209	27,300	30,002	38,250
United States of America.	108,809	190,200	246,730	370,000	221,672	277,050

It will be seen from the above figures that there has been an increase in the exports of German cement during the year 1903 to all the countries named, excepting the United States of America, and, according to recent trustworthy statements, the statistics for the year 1904 will probably show similar results. The decrease in the exportation of German cement to the United States of America is doubtless owing to the considerable development of the American cement industry, which, notwithstanding the generally growing consumption of cement in the United States, is rapidly becoming able to satisfy the home demand. The consumption of German cement in the United States of America was formerly, and especially in the year 1902, very considerable, and amounted to about 50 per cent. of the total foreign cement consumption in that country, being consequently larger than that of British cement.

Up to the end of last century the German cement industry, though already increasing its production at an extraordinary rate, continued to do a profitable business, and the average dividend paid by all of the larger cement works in 1899 amounted to 17 per cent. In the following year, however, the average dividend sank to 12 per cent., and at the same time the union of the syndicated groups of German cement works which had been established some years previously (and was thought by most of those

#### **The present position of the Industry.**

interested to be working satisfactorily) collapsed, owing to several groups retiring from the same. Since that time the German cement industry may be said to have entered upon a new phase, which certainly cannot be said to have been satisfactory for the interests of the German manufacturers. Since the collapse of the German Cement Trust in 1900 all efforts towards re-establishing it have so far failed. At the last general meeting of the German cement manufacturers, which was held at Berlin in October, 1904, for this purpose, no definite result appears to have been arrived at regarding its re-establishment, though the representatives of the eight groups who were present all gave their adhesion to the principle of forming again a union of the syndicate, and agreed upon a fixed minimum price and upon a strictly defined limit, within which each group should be allowed to dispose of its production.

One of the reasons why, up to the present, the efforts towards re-establishing the union of the German syndicated groups of cement works have been unsuccessful is that there are still a certain number of German cement syndicates who are of opinion that the best way of bringing about a more healthy condition of things (that is to say, the best way of raising prices) is to use all possible means towards effecting the suppression of those cement works which are not financially sound, by forcing them to sell their production at ruinously low prices. That such a policy can be carried out for any length of time, without ruinous consequences for all concerned, seems, however, hardly probable.

Although during the present year the home demand for German cement, in consequence of increased activity in the building trade throughout the German Empire, has been an unusually large one, the very low prices ruling for the last three or four years, and the above-mentioned competition among the German cement works themselves, are stated to have left only very small profits, if any, to the cement manufacturers in this country. An illustration of the fall in cement prices during recent years is also given by the above figures relating to the export trade, from which it will be seen that, though the total annual volume of the cement exports from Germany has largely increased, the total value has considerably fallen off.

The ruinous competition carried on during the last few years amongst the German cement works would, indeed, have been

hardly possible, were it not for the immense stocks of cement remaining on hands in most works in consequence of the continuous over-production. This over-production will, it is thought, show even more disastrous results when the statistics for 1904 come to be analysed, owing to a considerable diminution (it is said about 100,000 tons) in the cement exports from Germany, more especially to the United States of America.

Whilst, moreover, both the home and foreign consumption are already unable to absorb the immense quantities of cement produced in Germany, it is nevertheless a fact that more new cement works are being at present erected, so that in all probability a still larger output may be looked forward to in the near future, unless measures meanwhile be adopted towards restricting the production.

## SOME ASPECTS OF THE ORGANIZATION OF FRENCH AGRICULTURE.

During the present session there has been introduced in the Chamber of Deputies by the French Govern-

**The Foundation of  
the 'Syndicats  
Agricoles.'**

ment a Bill to provide for the grant of long term loans to Co-operative Agricultural Associations. This measure is but a further instalment of the legislation relating to agriculture,

which, commencing with the law of 1884, has exercised a far-reaching influence on French rural economy and marks a new era in the agricultural development of the country. The law of 1884—the great charter which laid the foundation whereon the new agricultural order rests—was a general enactment dealing with trade or 'professional' associations which the law then invested with the rights of civil personality, defining elastically the object of such associations as "the study and defence of economic, industrial and commercial interests." To these an amendment added the "interests of agriculture," and by this 'small door,' as M. le Cte. de Rocquigny remarks in his excellent monograph,\* the 'Agricultural Syndicats' entered on their eventful development. The law came at an opportune moment. French agriculture, suffering from foreign competition and from the drifting of the rural population townwards, was in need of new methods and a new spirit. The associative idea, already in the minds of certain agriculturists, received from the law a fresh impulse, and the movement, wisely directed towards the organisation of co-operative purchase, succeeded in gaining a firm hold on the confidence of the small farming community. The wonderful and rapid growth which followed was largely unforeseen, and while further assisted by legislation and the favour of the Government, its success has been due mainly to the initiative of private individuals and to the remarkable development of the associative spirit in the country. For the present it is possible to merely direct attention to certain prominent features and characteristics of the movement.

\* Les Syndicats Agricoles et leur oeuvre, Paris, 1900.

The centre, organically, of the new order is the conception of the syndicat. According to the definition of the law of 1884 the function of the syndicat is the study and defence of the interests of agriculture. The breadth of this definition has been of vital consequence.

**General  
Constitution and  
Organization.**

The syndicat in virtue of its general character has liberalised and vitalised a movement which might otherwise have been particular, disintegrated, and material. The syndicat has become the parent of other societies which, though having their particular object, nevertheless retain their affiliation. Thus there have sprung out of the syndicats numerous co-operative societies for special services of production and distribution, credit banks, insurance and other associations. It is the natural process of differentiation. But the point of cardinal importance is that the new agricultural organisation in France has been saved from being a series of unconnected or slightly connected groups, and that there has been secured a broad philosophic basis of policy which has had and is destined to have, an enormous influence on the efficiency of the movement. An organisation which consists merely of groups of societies developed for particular purposes can never exert an influence in any measure comparable.

The term syndicat is general in its character. It is applied to associations of the most varying sizes, and as the law did not prescribe the work of organisation but left this to individual initiative, several orders or classes of syndicats have been established. There are syndicats of the commune, of the district, and of the Department as well as of other Governmental areas. There are also unions of syndicates. A variety of types has been forthcoming, but by the natural process of selection the most useful survive, the services of the respective types are distinguished, and the system is being steadily if slowly co-ordinated. Experience in France

**Local  
and Central  
Associations**

as elsewhere has proved the great importance of the existence of small local societies federated or affiliated to an association of a larger area—such as the county—while in turn an association representative of all the counties, departments, or whatever the peculiar area may be, is required to give a proper co-ordination and solidarity to the movement. In France there has been a multiplication in the classes of

associations which seems excessive and hurtful to the real efficiency of the movement—a result of the freedom of the law—but this defect of its quality is already experiencing the remedy mentioned.

The 'communal' or small local associations are however, the root of the organisation. In the practical work of

**The Importance of  
the Commercial  
Associations.**

agriculture an agency which is at hand and immediate is essential. In material things, as in obtaining supplies, in storage, in the conversion of the material into a manufactured product, in the use of the more costly implements, the only agency which can efficiently develop common action is the local organisation. No less as regards other aspects of the movement the local association is the school of true co-operation and the agency by which closer intercourse can best be stimulated. On

**Need of Larger  
Associations.**

the other hand the larger association—such as that of the county, or department, or even of the whole country—is the complement of the local or communal association.

In material things, whether in the purchase of seeds or manures, or in obtaining favourable conditions of credit and of transport, the central association can command better terms. Similarly in regard to information and the guidance of policy it is able to afford invaluable assistance to the small societies. The significance of the inter-relation of local and central associations in France can, however, only be realised when the scope of the activities of the syndicate has been more fully indicated.

This scope may be briefly stated in the summary language adopted by the French Government.

**Scope of the  
Syndicats Agricoles.**

when on introducing their recent proposal with regard to co-operative credit, they attributed to the action of the syndicats the following results:—

- (1.) The lowering, by co-operative purchase, of the prices of chemical manures and of agricultural machinery.
- (2.) The diffusion and popularisation of new methods of cultivation, of the use of chemical manures and of agricultural machinery.
- (3.) The increase of the net product through combining to sell the produce of the soil, and through the action of associations for the working up and manufacture of agricultural produce.



- (4.) The improvement of stock by careful selection in breeding, and by making known methods of rational feeding of animals.
- (5.) The spread of agricultural education and information relating to rural work and interests by means of libraries, courses of lectures, conferences, experimental stations, etc.
- (6.) Assistance given in establishing associations for mutual aid for relief of sickness and support of the aged, and for arbitration and the settlement of disputes.
- (7.) The checking of frauds in commodities purchased for members.

This programme of results, even if realised only in a limited degree, is a striking testimony to the broad spirit and progress of French agricultural organisation. The remarkable growth of the movement is indicated by the fact that apart from other agricultural associations there are at present over 3,000 syndicats organised for the purchase of agricultural commodities. The

#### **Co-operative Purchase.**

the first great service, it may be noted, which the syndicats rendered to the farmers of France was to organise the purchase of manures and seeds. A much greater use of chemical manures, and greater attention to the quality of seed had become necessary if the small farmer was to compete successfully with the production of new countries, and to still find a remuneration in lowered prices. As things were, owing to the small consumption and the unorganised condition of the trade, the prices of manures were high and the quality uncertain. The individual farmer had not either the requisite capital or the knowledge to secure himself against fraud. Once, however, the principle of common purchase and the great economy and security which it afforded had been demonstrated, the movement spread rapidly, and the confidence of the farmers in the syndicats was assured. As a result the growth in the consumption of chemical manures in France since 1884 has been very marked, and is largely attributable to the cheapness and standard quality which combined action alone was able to secure. It was thus through the agency of co-operative purchase that the new organisation of agriculture obtained firm root, and, though limited in its scope, this has remained in many respects the most successful side of the movement. From manures and seeds it has extended among other things to the purchase of the more costly agricultural implements

and of breeding stock. In the former direction a group of societies known as the 'Syndicats d'Industrie Agricole' have rendered good service, while in regard to the improvement of breeding stock much has been done through purchases made by the syndicats of the Department of the East.

In the direction of co-operative production the progress of or-

**Co-operative  
Production and  
Manufacture.**

ganisation has not been so marked. Thus while there is a considerable number of co-operative creameries and cheese factories scattered over the country there is not the record of success which may be found in Denmark and Holland. On the other hand, in the production of wines and spirits, especially in the districts extending from the departments of the Charente to Marseilles the co-operative principles of production have taken a firm hold. In Normandy also, in the cider industry, co-operative factories are in course of being established. The field, however, in co-operative production, is for the present limited, and requires a combination of circumstances to make exploitation successful. It is true that in other directions also, as, for example, in the preserving of fruit and vegetables, or again in the manufacture of olive oil, co-operative societies have been started, but as yet the French spirit cannot on the whole be said to have shown a marked aptitude for co-operative production.

On the other hand, in the organisation of co-operative market-

**Co-operative  
Marketing.**

ing and selling, despite the greater difficulty of this operation as compared with joint purchasing, no small advance has been made. In several parts of the country associations for the sale of milk and its products have been organised. Again, in at least two districts, namely, in Normandy and in certain of the Departments of the East, co-operative associations have been formed for the sale of horses, cattle and poultry, but though the amount of produce disposed of by individual centres is in some cases relatively large, the co-operative organisation of this side of agricultural marketing has not reached great importance. During recent years also a development has taken place in the co-operative handling of grain crops, and 'maisons de blé' have been established. Or to take a further example which affords greater possibilities

of expansion many co-operative associations have been created for the sale and marketing of fruit, flowers, and vegetables. These articles which demand skill in assortment and packing, quick and cheap transit, and security of market, require especially to be handled by the agency of the associations. The large producer is in all cases independent, but the small growers, who in such industries are numerous, must be organised if they are not to be at the mercy of the transit and market agencies. Thus it was stated by the president of one of the vigorous associations which have been established in recent years, the *Syndicat Fruitier de Quincy-Segy* (Seine et Marne) that that society, founded in 1903, owed its origin to troubles experienced in obtaining a fair security of price. The buyers treated the small individual producers as they pleased. Accordingly in self-defence a co-operative association of local fruit-growers was formed, the membership of which is now 112, and 1,000 francs were borrowed from the credit bank for the purchase of better equipment. It is stated that during 1904 the sales of the association amounted to 36,118 francs, and that their combined action has enabled them to obtain prices 15 per cent. higher than they would otherwise have obtained, and to make more effective inquiries as to packing, requirements of markets, railway and shipping rates, and others matters on which the individual holders could not have informed themselves independently. The growth of such associations for the marketing of fruit, flowers and vegetables—and England is one of the chief markets—deserves the closest study in view of the possibility of extending these industries in Ireland.

Such are some of the forms which agricultural organisation in France has been taking. But no recital of the names of societies or of the different lines of exploitation which they are following, can give the essence of the movement. In French agriculture there is a new organic force which is continually manifesting itself in fresh vigorous developments. It is not simply an organisation, it is an organism, which is at work. France is a country in which words representing what are called abstract ideas have a great influence and power of expression. The spirit of the new movement is best expressed in the terms '*solidarité*' and '*mutualité*.' The principles of joint action, of combining to help one's self and one another, and of provision for the economic emergencies of life—of in a word social foresight—are the underlying forces. It is characteristic

of the French genius that it has not succeeded in **working out** certain aspects of the material development as efficiently as the Scandinavian or German peoples, but nowhere has, in the wide sense of the term, the logic of the movement—its reason, scope and purpose—been more clearly realised.

No less important than the development of an organisation for the purchase of materials or the disposal of products is the establishment of a system of **Agricultural Credit in France.** It has become more and more widely recognised that in the present condition of agriculture such a system is a corner stone of any sound co-operative structure. To be able to obtain capital at a low rate as an individual and collectively, is the condition of being able to carry out the economic reorganisation and rehabilitation which is essential to the life of the farming, and especially of the peasant farming community. The steps which the French Government have taken and are taking towards assisting the development of agricultural mutual credit, while not equal in their results to the achievements in Germany, are nevertheless of no small interest. The early years of the co-operative movement in France and the growth of the organisation of agriculture were weakened by the ineffective development of credit institutions. These remained to a considerable extent independent of the syndicates. Also the principle of unlimited liability did not on the whole commend itself under the existing organisation to the small holders. It became clear that greater confidence must be created, and that the syndicates must be induced to take up the organisation of a credit system. To this end the law introduced by M. Meline in 1894 has greatly assisted. It enabled a syndicate—or groups of members in a syndicate—or a group of syndicates—to organise under liberal conditions credit banks. These were also to be banks of deposit, and could practically fulfil the rôle of savings banks. Further, a law of 1895 authorised the ordinary savings banks, municipal and others, to invest the fifth part of their capital and a large part of their revenue in loans to agricultural credit societies. In 1898 other privileges were granted. Certain syndicates had made advances to the members on agricultural ‘warrants.’ The law required, however, that articles on which warrants were issued should be deposited in public stores, but the new legislation granted to institutions of public credit the right of issuing loans on warrants while the article remained with the producer. Despite, however,

the extension of agricultural credit, which took place after 1894, it was still seen that further assistance was necessary if the system was to extend widely, and to render the greatest service to the farming community. Hence there followed the important enactments of 1899 and 1900, whereby a system of 'banques régionales'—provincial or county banks—was established. By the law of 1899, which extended the privilege of the Banque de France, it was provided (Art. 8) that that institution shall pay each year to the State a rent—based on the discount operations of the bank—which rent, however, may not fall below two million francs annually, and also (Art. 7) that the bank shall place at the disposal of the State free of interest and for the period of the privilege of the bank—till 1920—a new advance of forty million francs. By Art. 18 it was provided that the sums stated in Articles 5 and 7 be reserved and carried to a special account at the Treasury until a law has provided the conditions of establishing one or more credit banks. On consideration it was held that the organisation of provincial or 'regional' banks—caisses régionales—rather than a large central bank would serve better as agents between the local associations and the credit which the Government were prepared to place at their disposal. In 1900 it was further enacted that the caisses regionales could receive advances from the State equal to four times their capital in coin. As a result of these measures between January, 1900, and December 31st, 1904, 16,000,000 francs have been advanced to the regional banks, the number of which is at present 59, while the number of local banks affiliated amounts to 957, having 43,608 members. The great success which has attended the operations of these large banks has led to the introduction by the French Government of the present bill for the establishment of 'long term credit.' Hitherto loans could only be given for short periods. It is now proposed that the Government should loan funds to the 'caisses regionales' at the rate of one per cent. for a maximum of twenty-five years. These funds are to be a first charge on the annual rent paid by the Bank of France to the Government. The money issued will in turn be advanced by the 'caisses regionales' to the local agricultural co-operative societies at the rate of two per cent., the 'caisses regionales' obtaining thus a commission of one per cent. for their work. Requests for loans from the local societies will be made through the agency of the 'caisses regionales' to a general standing committee appointed by the Minister of Agriculture. It is provided that a loan may not exceed twice the capital in coin of the society. Such are the main proposals of the Government with re-

gard to the establishment of long term loans by which it may be said the main structure of agricultural credit will be completed—a result of great importance, especially to the small farming community.

A system such as co-operation becomes the more sound and economic as it grows more complete. One

### **The Organisation of Insurance.**

activity complements and confirms another. Thus the organisation and economic stability of agricultural credit is increased by the development of a system of mutual insurance. Insurance safeguards the basis of credit, and a sound co-operative organisation should include the establishment of an insurance system, whether carried out through the agency of existing private companies or through independent mutual associations of co-operators. Co-operation is not simply a grouping of individuals, but a grouping and mutual development of the several relationships which go to make up, for at least the small holder, the economic synthesis in life, viz.:—mutual aid in producing and distributing, mutual credit, insurance, education and the interchange of ideas. A system which contents itself with part is but a stunted form. In France one of the most vital characteristics of the new order is the fulness of the concept of co-operation. Credit, if at first it was weak, has developed greatly in recent years. Insurance has had an earlier and in some aspects an even more remarkable evolution. The French peasant is careful and thrifty, and if credit has only slowly secured his confidence, insurance was a more congenial idea. It was already familiar to him, for in rural districts private companies had organised insurance against fire, and the *Syndicats Agricoles* have largely directed their energies towards obtaining from such companies special terms for their members. This they have succeeded in doing, inasmuch as in return the private companies have benefited by the extension of their clientele and by the reduction of agency expenses. Of more special interest, however, are two forms of agricultural insurance which have also received the one a limited, the other a much more extended development on the part of the *syndicat*. The insurance of crops against hail, which is often a serious cause of loss, has been

### **Insurance against Hail.**

organised in several districts, but inasmuch as such insurance is attended with considerable risks, and as it is desirable that such risks should not be too localised, it has been found advisable for

at least the early years of the movement to depend on the commercial insurance agencies. In some cases the syndicat acts merely as the agent of a private society—in others it may itself undertake the insurance, re-insuring, however, for the larger part of its responsibility with the strong financial companies. In still other cases associations of “assistance” have been formed, which, while not effecting insurance, have for their object the extenuation of any disaster by means of a reserve fund. There are circumstances to which each of these types is the best suited. The whole question, however, of the means which can modify the evil effects of sudden losses due to storm or blight is of great importance to agriculture, and experience has proved that much can be done in this respect on sound lines. Wider in its extension has been the development of insurance against mortality in

### **Insurance of Live Stock.**

live stock. In this scheme the syndicates have, owing to the economic conditions of such insurance, been able to adopt more strictly mutual and co-operative action. The great scope of such insurance, the improved means of checking outbreaks of disease, the existence of several classes of live stock—all of which are not likely to suffer from an outbreak simultaneously—the importance of local knowledge, are conditions which favour the organisation of a form of co-operative action. Further, by means of a system of local societies federated into a strong union extending over a wide territory, a stable and economic organisation can be established. The famous association of the syndicat of the Department de la Sarthe has shown how economically the work of insurance can be effected by a strong federation, and how also the central association can assist in the foundation of local branches. In this connection it is worthy of notice that to increase the sense alike of local and individual responsibility it is of advantage on the one hand to make the insurance for a sum less than the total value of the stock—for example, 80 per cent. of the total value; and on the other hand it is advisable to effect a distribution of the insurance between the local society and the federation, the local society to bear, say, 30 per cent. of the insurance, and the federation the remaining 70 per cent., an equivalent division of the premium being made between the two organisations. Hence if the losses in the particular district are heavy, while the whole federated community suffers, a certain additional proportion of the loss remains with the society in whose territory the outbreak has occurred.

There is a great future for the extension of insurance amongst live stock, and the subject has received much attention in Europe, of late notably in Italy. The French experience, however, in this aspect of associated action is especially varied and valuable.

Mention can only be made of the organisation of insurance against accident amongst agriculturists.

**Insurance against  
Accidents.**

In this direction a considerable development has taken place in France, but as in the case of fire insurance it has been found expedient to use the resources and experience of the old-established societies, some of which have devoted special attention to the insurance of agricultural risks.

The scope, however, of the new organisation of agriculture in France cannot be realised without reference to certain more general aspirations of social policy. Among the functions which the law has attributed to the *syndicats* is that of assisting in establishing agencies of thrift,

**Social Functions  
of the  
Syndicats.**

of mutual aid, of relief of the aged and the unfortunate. Considerable development in this direction has taken place, and the 'caisses de retraite' and other similar institutions deserve careful study. In brief, the foundation of the *syndicats* has provided an organisation which, so far as the agricultural community is concerned, seems to make possible the working out of a sound system of social insurance on mutual lines. Considerable funds have al-

**Mutual Aid  
Organisation.**

ready been accumulated for 'benefit' purposes, and the older the movement grows the more the value of this social activity is recognised. The State has further assisted since 1898 the efforts of the societies by paying an interest of 4½ per cent. on deposits made by the *syndicats* for such social reserve funds—thus contributing in a manner which stimulates self-help, while it gives at the same time a certain control over the funds and a security of investment. The societies on their part have various ways of contributing to pension and relief schemes, sometimes by a direct contribution, in other cases by allocating a certain portion of their profits. Thus the central *syndicat* of Belleville sur Saône, which has taken a leading part in formulating schemes of pension and mutual assistance, has by means of the profits in its "nurseries" been able to place a considerable credit to a 'mutual



aid' fund. This side of the movement is still in its beginning, but it has a great possibility before it, and the growth will afford an invaluable reserve-power and stability to rural life.

There are, however, other services of great social value which the syndicats have rendered. They have

**Registries of Labour and Information Bureaus.**

formed registries of labour and bureaus of information—agencies of great service which can be best carried into effect through local organisations in close touch with one another. In France the syndicats have this close relationship, and the freemasonry existing within the syndicats, which are composed of all classes, enables them to be an excellent centre for such duties as that of a labour bureau. Again, as a centre for dissemination of information they are of great importance. The federated syndicats have in many cases their own organ—some of which have a wide circulation. Through this press medium, through leaflets, by means of lectures, and in some cases, as in that of the cantonal syndicat of Saint-Amant-de-Boixe, by the institution of circulating libraries, they stimulate the intellectual life of the rural districts.

**Educational Influence of the Syndicat.**

The syndicat has, it may be said, become at once the school and club of the farmer. The leaders of the new agrarian movement in France recognised that in face of modern conditions the producer, small as well as great, must realise above all the conditions which make foreign competition serious, must study the means by which it can be economically met, must keep an open mind on the question of the labourer and his rights, must understand what public service can yield, and what private enterprise must supply, must be always a learner. The French nation has a marvellous power of conception. and though a programme such as the syndicats have presented to themselves, cannot be realised in a day or a generation, the idea has been set up—a positive and rightly conservative force to meet disintegrating conditions moral and intellectual as well as material. Also the syndicats are rendering service not only to the grown generation but to that which is rising. They have taken a close interest in the development of agricultural education alike in the primary and the secondary schools of the country, and even if there may not be always agreement with the opportuneness or the soundness educationally of their policy, they have brought pressure to

bear on the subject, and have stimulated thought and action. Moreover, by reason of their representative character and of their knowledge of local conditions they have assisted in relating rural education to local circumstances—an aim which, under proper methods of training the faculties of observation and of relation and reason will be admitted to be not only advisable but essential to the most effective education. But the syndicat is the club as well as the school of the farmer, and has contributed greatly to the sociability of rural life. The common meeting place, the seasonal reunions, the regard for local customs and local spirit—local song and local speech—have with the other

**A Centre of  
Social Interest.**

aspects of syndical activity awakened the soul of the country. Such are some of the features of the syndicat—the institution which has been the centre of the revival of agriculture in France. But one point, and that of the greatest importance, must still be noticed.

The strength and success of the syndicat has been due largely to the broad conception of its scope—the study and defence of agriculture—and to the fact that it has been representative of all the agricultural classes. It has been a ‘syndicat mixte.’ Landlord

**The  
Representative  
Character  
of the  
Syndicats.**

farmers, tenant farmers, great farmers and small farmers, small holders, agricultural labourers—all have met in the syndicat. The aim has been to bring out common or reciprocal interests, to prevent the separation of classes, to give to the individual—especially the economically weak individual—the credit and counsel of the strong, and to combine the best thought, goodwill, and energy in establishing a prosperous farming community. It is not easy to over-estimate the importance which the combination of various social classes has had on the policy of the movement. It has above all given it a generous human outlook which, if the direction of affairs were left with the small farmers, would have been largely lacking. And further, the combination of all classes has enabled the Government to proceed with the constructive legislation of recent years, the results of which are destined to have a far-reaching influence on French agriculture.

The constitution of the syndicats is of the simplest character, but it is admirably suited to the work which has to be done. An institution having a right spirit within it is the thing needful. Given

that, and freedom from restriction, the natural 'souplesse' of the organisation enables it to meet new circumstances. But the success of the movement depends on its scientific and social character. The agrarian movements abroad—and the syndicats in France have been accused of the same policy—are in danger of setting the agricultural interest at war with other industrial interests. The true strength on the other hand of such a movement as that of the 'syndicats agricoles' rests in its search strictly after economic methods and efficiency of organisation. When it pursues this end, and enlarges its view to develop institutions of mutual helpfulness and social foresight, the agricultural association becomes second to no agency as an instrument of rural stability and solidarity, and will keep the confidence and sympathy of the whole industrial public.

W. G. A.

## THE USE OF ALCOHOL IN INDUSTRY.

The Departmental Committee on the use of Alcohol in Industry, appointed by the Chancellor of the Exchequer, has presented its Report (Cd. 2472-1905). The Committee was instructed to consider the existing facilities for the use, without payment of duty, of spirits in arts and manufactures, and in particular into the operation of Section 8 of the Finance Act, 1902, and to report whether the powers conferred upon the Commissioners of Inland Revenue by this section permit of adequate facilities being given for the use of spirits in manufactures and in the production of motive power, or whether further facilities are required. The Committee was also required, if it should appear that the present facilities are inadequate, to advise the further measures to be adopted, without prejudice to the safety of the revenue derived from spirits, and with due regard to the interests of the producers of spirits in the United Kingdom.

In interpreting the terms of reference, the Committee considered that the main objects of its inquiry were to ascertain the extent to which alcohol is, or might be, employed in arts and manufactures, or in the production of heat, light, or motive power; and to determine the conditions of greatest freedom that could be accorded to its use for those purposes, consistently with adequate safety to the revenue derived from spirit as an article of human consumption.

### Scope of the Inquiry.

The Committee has, therefore, confined its attention almost exclusively to these points; and has not attempted to deal fully with allied questions, such as possible changes in the methods of producing spirit, or the materials from which it may be obtained, or such as the actual or possible sources of supply.

The Committee did, however, for special reasons, take some evidence on the question of the production of spirit from potatoes; enough to show that in the present agricultural conditions of this country it would not be possible to found a profitable industry on the employment of potatoes as a material for distillation.

(In this connection, see the article, "The Manufacture of Alcohol from Potatoes," by J.H.H., in the *Journal* for January last, Vol. V., No. 2, p. 309.)

In order to obtain evidence, the Committee applied to the Association of Chambers of Commerce of the United Kingdom, and to the Chambers of Commerce of London, Liverpool, Manchester and Birmingham; and the majority of witnesses examined were gentlemen selected by those bodies, as representatives competent to speak on behalf of the several industries in which alcohol is, or might be, employed. Of the rest, some came at their own request, while others came on direct invitation. In addition to oral evidence, much information was laid before the Committee in the form of memoranda prepared by the Board of Inland Revenue, in regard to the regulations in this and other countries governing the use of spirit for industrial purposes, as to the quantities of spirit so used, and as to the Rules and Regulations laid down by the Board of Inland Revenue under the Act of 1902. Lastly, as in the evidence of certain of the witnesses who came before us much stress was laid upon the system and regulations established in Germany in connection with the industrial use of alcohol, the Committee felt it was very desirable to procure information at first hand upon that subject; and accordingly sent a deputation to Germany for that purpose.

<p><b>Conditions governing the use of Spirit for Industrial Purposes.</b></p>	<p>The use of methylated (denatured) spirit duty-free was first authorised in 1855 by the Act 18 &amp; 19, Vict., c. 38. The present law on the subject is contained in the Spirits Act, 1880, as amended by the Customs and Inland Revenue Act, 1890, and Section 8 of the Finance Act, 1902.</p>
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The practice resulting from the law has been as follows:—

Up to the year 1855, spirit could not be used duty-free by the public under any circumstances. From 1855 to 1861 it could be used duty-free for manufacturing purposes only, if methylated according to the prescribed process.

From 1861 to 1891 spirit could be used duty-free for any purpose other than consumption directly or indirectly as a beverage, or internally as a medicine, provided it was mixed with wood-naphtha to the extent of one-ninth of its volume. But, if used in large quantities, as for manufacturing purposes, it could not be purchased from a retailer of methylated spirit, but only from a methylator, and the user was subject to Excise supervision.

From 1891 to 1902, the use of this kind of methylated spirit (which came to be described as "ordinary" methylated spirit)

was confined to manufacturing purposes, subject to the same conditions as before; while for general purposes a spirit, consisting of the above spirit with an addition of 375 per cent. of mineral naphtha (petroleum), and known as "mineralised" methylated spirit, was brought into use. It is only in this spirit that retailers are permitted to deal.

Since 1902, the two kinds of methylated spirit have continued to be used as before. But an alternative to their use has been opened to manufacturers, under which spirits may be employed after being subjected to some special process of denaturing, appropriate to the particular industry, or possibly even in a pure state, should circumstances be held by the Board of Inland Revenue so to require.

Advantage has been taken of the Act of 1902 by a certain number of manufacturers. There seems, however, to be in some quarters a very inadequate acquaintance with its provisions, and much failure to appreciate its significance; and the beneficial effects of the Act have, on this account, been less widely diffused than they might have been. It may reasonably be expected that, as a result of this enquiry, enterprising traders will more largely avail themselves of the provisions of this Act.

The "Ordinary" Methylated Spirit is open to certain objections as a material or instrument of manufacture. In a few cases it is unsuitable by reason either of the chemical properties or of the smell of the wood-naphtha it contains. But even where its character is not a serious objection, it is still always open to this disadvantage, that it is somewhat heavily enhanced in cost as compared with pure spirit. For not only does the wood-naphtha, which must be present to the extent of 10 per cent., cost more than double the price of the equivalent quantity of spirit, but now and again it tends to make the mixture less efficient for the purpose in view than it would be without this ingredient.

**Hindrances  
to the use of  
Spirit for  
Industrial Purposes.**

It was to meet these objections that legislation was undertaken in 1902; and the Committee is of opinion that Section 8 of the Finance Act of that year does all that is possible in respect of the character of spirit. It has entirely removed all difficulty in the way of procuring a spirit suitable in character for any industrial purpose. It has also to some extent mitigated the objection on the

score of cost, inasmuch as the special processes of denaturing authorised by the Board of Inland Revenue are commonly less expensive to the manufacturer than is the case with "Ordinary" Methylated Spirit. On the other hand, the cost of these processes is enhanced by the charges for Excise supervision.

The cost of denaturing, however, touches a part only of the question of the price of the spirit used for industrial purposes. An influence on price, even more important, lies at an earlier stage of production of the spirit, viz.:—in the conditions under which spirit can alone be manufactured in this country. The duty on spirit used as a beverage in the United Kingdom is very heavy, and in imposing this duty it is essential to the protection of the Revenue to impose on the manufacture of spirit such restraints as may be necessary to prevent any spirit from escaping payment of duty; and a consequence of such restraints must be to cause an appreciable increase in the cost of manufacture. What the measure of this enhancement may be is not susceptible of precise determination; and even an approximation to it can only be reached by persons with a minute and practical knowledge of all the details of manufacture and of trade on the one hand, and of what is required for the protection of the Revenue on the other. The Committee have, therefore, not attempted to investigate all the elements that enter into the calculation, but have accepted the figures that have been established by law and practice as applicable to the present situation. These figures may be taken as representing an enhancement of the cost of producing plain British spirits by 3*d.* the proof gallon, or an increase of about 50 per cent. on the cost that would otherwise prevail in the production of industrial alcohol. It is patent that producers thus hampered could not hope to compete successfully, either in the home or in foreign markets, against rivals not similarly hampered, unless some counterpoise were provided to the burdens that fiscal restrictions impose upon them. Accordingly, the law does provide such a counterpoise—in the case of the home market, by making the duty on imported spirits exceed the duty on British spirits by an amount equivalent to the burdens on the home producer—this is called the "Surtax"—and in the case of foreign markets, by granting to the home producer allowances calculated on the same basis. These export allowances are at the rate of 3*d.* per proof gallon on plain spirits, and 5*d.* per proof gallon on compounded spirits, and it is the higher of these two allowances that is taken as determining the measure of the "Surtax" on all imported

spirits other than Rum or Brandy, on which the "Surtax" is 4*d.* the proof gallon. The final result upon the price of industrial spirit of all the measures taken to protect the Revenue may be stated as follows:—Spirit used in manufacture is commonly about 64 over-proof (about 93 per cent. on the Continental standard of pure alcohol), and is plain spirit. Therefore, the price of a bulk gallon of the spirit is about 5*d.* more than it would have been, but for Excise restrictions. The cost of methylating may be put down at between 3*d.* and 4*d.* per bulk gallon, so that of the price eventually paid by the manufacturer, which at present may be taken at from 20*d.* to 22*d.* per bulk gallon for large quantities at wholesale price, about 8½*d.* is attributable to precautions on behalf of the Revenue.

The two considerations (*a*) of the conditions in which spirit must be used, and (*b*) of the price at which it can be procured, affect different industries in very varying degrees. Either consideration may be of vital importance to a particular industry. But the Committee is of opinion that, taking the whole range of industrial enterprising employing alcohol, the question of price is infinitely the more important of the two. The number of cases in which it has been conclusively shown that ordinary methylated spirit is seriously detrimental by reason of its character are remarkably few, whereas the cases are numerous in which a difference of, say, 6*d.* per bulk gallon in the price of alcohol might make all the difference between profit or loss in the carrying of an enterprise.

To illustrate this opinion a review of the evidence in respect of some of the more important industries employing alcohol is given.

#### **Coal Tar Colour Industry.**

The Coal Tar Industry is taken first, because it has figured very prominently in the discussions which have led up to the present inquiry. In the course of these discussions, it has frequently been asserted that the Coal Tar Colour Industry, which originated and at one time flourished in Great Britain, has been lost very largely, if not mainly, by reason of the obstacles in the way of a cheap and untrammelled supply of alcohol. In view of the prominence given to this assertion, it was thought desirable, even at the risk of travelling somewhat beyond the immediate purpose of the inquiry, to procure authentic evidence upon the subject. With that object Dr. W. H. Perkin, the discoverer in 1856 of the first Coal Tar Colour, was invited to appear before the Committee; Mr. R. J. Friswell, who was engaged in the



manufacture of aniline dyes from 1874 to 1899, and Professor Meldola, who was similarly engaged from 1870 to 1885, were also asked to give evidence.

On a review of all the evidence, the Committee are of opinion that, regarded as a statement of historical fact, the assertion that the Coal Tar Colour Industry has been lost to this country on account of obstacles to the use of alcohol is destitute of substantial foundation.

In the earlier days of the industry alcohol was used almost wholly as a solvent, and for that purpose methylated spirit is suitable. Moreover, when alcohol first began to be used as a constituent of dyes, and until some time after the decadence of the industry in this country had become marked, the margin of profit on the manufacture was so great that the difference in price even between duty-free and duty-paid alcohol was a matter that could practically be left out of consideration.

To examine at length into the causes that did, in fact, contribute to the decadence of the industry in this country and to its rapid development in Germany, would be to carry the inquiry beyond the terms of reference, but the Committee states that the evidence taken shows that the cause which predominated over all others was the failure of those responsible for the management and for the finance of the industry here, during the years 1860-1880, to realise the vital importance of its scientific side, and their consequent omission to provide adequately for its development on that side.

But while stating this in the interest of historical accuracy, the Committee do not infer that what was true of the period 1860-1880, is true at the present time. On the contrary, it is unquestionable that, in some branches of the colour industry, with alcohol playing a considerable part as a constituent of certain dyes and with profits cut down by competition to a narrow margin, the circumstances under which, in respect of condition and of price, alcohol can be used have become of importance. But here too, it is necessary to guard against exaggeration. Large classes of the Coal Tar Colours—alizarine, indigo, and by far the greater number of the azo dyes—require no alcohol for their manufacture either directly or indirectly, and these represent by far the larger proportion of all the colours produced.

Nevertheless, even where alcohol is not immediately required for the manufacture of a dye-stuff, the utilisation of waste products and the development of new methods may be hampered by a want of

alcohol; while, for those dye-stuffs for which alcohol is essential, its price and the conditions of its use are matters of great moment. The Committee is of opinion, therefore, that, if the hope is to be entertained of recovering any considerable portion of this trade, more favourable conditions must be established in respect of the use of alcohol.

On the question whether in the manufacture of smokeless powder ordinary methylated spirit is unsuitable or detrimental in character,

the evidence laid before the Committee appears conflicting and inconclusive. As Sir W. Crookes puts it, it is known that very slight chemical variations in the materials employed may produce very marked variations in the quality of the powder produced, more especially as regards its stability; to determine whether the chemical composition of ordinary methylated spirit (or of methylated ether) would or would not affect the stability or other properties of a powder, would demand costly experiments extending over many years; and there has not been any sufficient inducement to undertake such experiments. The Act of 1902 still further diminishes the inducement, and all the more so because there is probably no single industry in which exceptional advantages as regards the use of spirit could be accorded with less risk to the Revenue. The workmen employed are of necessity men of steady and trustworthy character; they are subject to the strictest supervision; and the manner in which spirit enters into the process of manufacture gives but little opening for speculation.

But the question of the price of spirit and ether is one of vital importance to the manufacturer of smokeless powder, of which nitro-cellulose is a constituent.\* The quantity of alcohol used, either directly in the form of spirit, or indirectly in the form of ether, for the production of one pound of this powder is very large. What the exact amount may be it is difficult to determine, because so much depends upon the amount of spirit that may be recovered from any operation, and this varies as between one operation and another, and as between one factory and another. But one witness gave us to understand that a difference of 6*d.* per gallon in the price of spirit would make a difference of 7*d.* per pound in the cost of the powder produced; and it is manifest that even a much smaller difference than that would turn the scale between profit and loss.

\* It is an open question amongst the authorities whether the powder of the future will be one requiring alcohol for its preparation.

In the production of fine chemicals alcohol plays a very important part. For a large, and probably increasing, number of substances, such as the synthetic perfumes, antipyrine, phenacetin, sulphonal,

**Pharmaceutical  
Products—Fine  
Chemicals.**

and so on, alcohol at a price not in excess of that at which it stands in competing countries, and usable under conditions not inimical to the quality and character of the compounds produced, is essential to the existence of the industry. The industry presents certain features of difficulty, because, in the first place, there are large numbers of pharmaceutical preparations in which the alcohol remains as free spirit, and which must continue to be made from duty-paid spirit; and because, in the second place, the preparations are so numerous and so various in character that there are difficulties in making a single process of denaturing applicable to them all. But these difficulties have been satisfactorily overcome in Germany, and there is no reason why they should not be overcome here. The manufacture of synthetical chemical products with duty-free alcohol, however, would have to be completely and effectually separated from the manufacture of preparations (as for example, tinctures) in which the alcohol remains as such, and which, therefore, must be made with duty-paid spirit.

The production of ether has become a most important industry, large quantities being required for manufacturing purposes (*e.g.*,

**Ether.**

smokeless powder, artificial silk, etc.) and for refrigerating purposes. For most, if not for all of these purposes, ether made from ordinary methylated spirit is quite suitable. But, inasmuch as it requires much more than a gallon of strong spirit to produce a gallon of ether, the price of spirit is manifestly a consideration of primary moment to this industry. Incidentally, it may be mentioned that in the course of the evidence, the question was raised whether the present rates of import duty on ethers are the correct equivalents of the duty payable on the spirit necessary to produce them.

Lacquers and varnishes are usually made with the ordinary methylated spirit, where spirit enters into the manufacture. (Spirit

**Lacquers,  
Varnishes, &c.**

is not required for lacquers that are applied cold.) In a few rare cases pure duty-paid spirit is employed for the finest kinds of lacquer. On the question whether methylated spirit is detrimental

to the character of the product, the evidence submitted was conflicting—some witnesses insisting that it is detrimental, another, representing a considerable section of the trade, maintaining that it is not. Specimens of goods treated with lacquer made with pure spirit, with ordinary methylated spirit, and with wood naphtha respectively, were submitted; little, if any, distinction between them was perceptible to the unprofessional eye.

However this may be, for this trade neither the character nor the price of spirit under existing conditions, creates any serious hindrance, except, perhaps, for goods exported. For in the home market, the trade enjoys a considerable measure of practical protection, owing to the fact that imported lacquers and varnishes containing spirit are charged full spirit duty on the quantity of spirit contained.

Spirit is not used at present in this country as a fuel for motor vehicles. Nor is it so used to any great extent either in Germany or in France, in spite of the fact that both these countries are most desirous of encouraging the use of a material that is indigenous, in preference to a material, like petrol, that has to be imported. Where spirit is used for motor or other engines in those countries, it is almost entirely for agricultural engines. For motor cars, spirit presents certain special difficulties, which require to be overcome, the principal being the behaviour of alcohol in very cold weather and the tendency of the acids generated by its combustion to cause corrosion of the metal surfaces with which they come in contact.

On all the facts, the Committee has arrived at the following general conclusions:—

- (i.) That where spirit is used for general and universal purposes, such as heating or lighting, the present "mineralised" methylated spirit is perfectly satisfactory, both to the Revenue and to the public, in respect of character, and that at present no better method of denaturing is available. In respect of price, the cost of mineralised methylated

spirit is enhanced by some 40 per cent. by reason of measures necessary for the protection of the Revenue. But to countervail such enhancement would be merely to relieve the whole community of a burden in one direction by putting upon it an

#### **Motor Vehicles.**

#### **General Conclusions.**

equivalent burden in another, seeing that the cost of relief would necessarily have to be made up to the Exchequer from some other source of taxation. Thus there would be no real balance of gain to the community as a whole from arrangements that would of necessity be somewhat complex, and would entail a certain cost in their application. Having regard, however, to the practical security that is provided for the Revenue by the process of denaturing adopted in the case of this spirit, the regulations in regard to distribution might be appreciably relaxed in respect of the quantities that retailers may keep in stock, or may sell at any one time to a customer. It is recommended that the regulations should be left to be prescribed from time to time by the Board of Inland Revenue, instead of being stereotyped in the Statutes.

(ii.) That where spirit is used for industrial purposes, the Finance Act of 1902 provides adequate and entirely satisfactory machinery for securing that the spirit may be used in a condition that is suitable and appropriate to each particular purpose of manufacture. The machinery is elastic—much more so than is the corresponding machinery in Germany—and it permits of every reasonable process of denaturing, or even, in the last resort, of the use of spirit in a pure state. For more than this it would be impossible to ask.

(iii.) That something more is required in order to place spirit used as an instrument or a material of manufacture on a footing satisfactory in the matter of cost. Anything in the nature of a bounty is undesirable. But seeing that on the price of spirit the very existence of certain industries may depend, and that for all industries using alcohol the price of spirit is an important factor for that portion of trade that lies outside the home market, it is desirable to make such arrangements as will free the price of industrial spirit from the enhancement due to the indirect influence of the spirit duties. It would be disastrous if, to the mischief that the drinking of alcohol causes by diminution in the efficiency of labour, the taxation of alcohol should be allowed to add the further mischief of narrowing the openings for the employment of labour.

The Committee reports that there is only one way in which the influence of the spirit duties can be satisfactorily counteracted in favour of industrial alcohol. To diminish the Excise restrictions on the manufacture of alcohol might mitigate the influence, but

probably not to any great extent. For with a duty of over 1,000 per cent. on the prime cost of an article, Revenue control must of necessity be strict. Moreover, the gain to industry would be made at the risk of the Revenue, and a duty that yields over £20,000,000 per annum to the Exchequer is a public interest that cannot be trifled with. To relieve imported spirit from the surtax which is needed to counterbalance the burden imposed on production in this country by the Excise regulations would be manifestly unfair; and its effect would be to give to the State-aided spirits from Germany or Russia a practical monopoly of the market in this country for industrial spirit. The only adequate course is to neutralise, for industrial spirit, the enhanced cost of production due to Excise control, in the same way as the enhanced cost is neutralised for exports, viz.: by granting an allowance on such spirit at such rate as may from time to time be taken as the equivalent of the increase in cost of production due to Revenue restrictions. At the present time, the rate is taken at 3*d.* per proof gallon for plain spirits, and the allowance would accordingly be at this rate, and should be paid equally on all industrial spirit, whether it be of British or of foreign origin.

It is not suggested that the cost of methylation should be borne by the State although a strictly logical application of the principle of attempting to put industrial alcohol on the footing that it would occupy, if there were no duties on spirit, might seem to require this further concession. But the manufacturer using alcohol has so strong an interest in rendering it unpotable for his own protection that he may fairly be asked to accept denaturing as a necessary incident of use, the cost of which he should bear.

At the same time the charge on the manufacturer might reasonably be limited to paying the cost of the denaturing agents and of the mixing of them with the spirit; and he should not be required to pay the cost of regular attendance of the Excise officers, which is given wholly in the interests of the Revenue. Attendances at irregular times, at the special request and for the special convenience of the manufacturer, might, if necessary, continue to be charged against him.

For ordinary methylated spirit (which will continue to be used for many industrial purposes for which it is not, in the words of the Act of 1902, "unsuitable or detrimental") the formula of methylation may safely be modified, and the proportion of wood-naphtha reduced, so that the mixture may consist of ninety-five

volumes of spirit to five of wood naphtha. This will at once somewhat cheapen the methylated spirit, and will also diminish any prejudicial effect that the chemical properties of wood-naphtha may have for certain manufactures; while it will continue to " earmark " the spirit sufficiently to allow of detection by analysis, should the methylated spirit be used for any improper purpose. It must be remembered that this kind of methylated spirit can only be used by persons holding an authority from, and under heavy bond to, the Commissioners of Inland Revenue (whereby its employment is subject to control and supervision, which can be graduated according to circumstances), and that consequently the risk of fraud is limited.

Methylic alcohol used for industrial purposes might be accorded special treatment. It is understood that the Board of Inland Revenue do not consider that it would be safe to revert to the position obtaining before 1865, when methylic alcohol was regarded as wholly outside the scope of the spirit duties; and their opinion receives support from the fact that in France the law has recently been altered so as to define more precisely the degree of purity which shall render methylic alcohol liable to duty. The object in view can, however, be sufficiently met without taking methylic alcohol out of the charge for duty. It would meet all requirements in respect of methylic alcohol if it were exempted from the condition of the proviso to Section 8 of the Act of 1902, which requires payment of the surtax on all imported spirit used for manufacture, and if the Board of Inland Revenue should exercise their discretion under the section in the matter denaturing in such a way as to permit the use of methylic alcohol practically pure. This, it is believed, they would be willing to do; and exemption from the surtax would be fully justified, inasmuch as the manufacture of methylic alcohol in the United Kingdom is not, in fact, subjected to any restrictions that enhance the cost of its production.

While making the concessions above described, it would be right, in the interests of the Revenue, that special denaturing agents authorised for use in particular industries should be subject to official test; and further, that manufacturers who are authorised to employ specially denatured alcohol should be required to keep such books as may be prescribed, showing the receipts and issues of spirit, the manner in which it has been distributed to the several branches or departments of the factory, and the quantities produced of the articles manufactured with it.

The Committee is of opinion that the recommendations made, if adopted, will place the manufacturers of this country in respect of the use of alcohol in industry on a footing of equality, in some respects of advantage, as compared with their competitors abroad. Amongst the witnesses who appeared before the Committee there was found a very general impression that, in Germany at any rate—and Germany is our most formidable competitor in this field—spirit could be used in manufacture duty-free and pure, with scarcely any restraint. This is very far from being the case. As regards price, the grant of the export allowance would make the average price of industrial spirit in the United Kingdom even lower than the average price in Germany. The price, exclusive of the cost of any denaturing, would, under present conditions, be about 7*d.* the proof gallon, or about 11½*d.* the bulk gallon at 64 over proof—the strength common in industrial spirit. That is as low as the minimum price paid by users in Germany in the year 1902, when spirit was abnormally low, and is much below the figures of 1*s.* 3½*d.* per proof gallon, and of 2*s.* 1½*d.* per bulk gallon prevailing in Germany at the present time. Further, the price of spirit in this country, where all materials may be freely used, and where none of general use are subject to taxation, is a stable price. In Germany the conditions of production tend to wide and rapid fluctuations in price.

At the same time, it would be a mistake to suppose that any facilities given for the use of spirit in this country are likely to create such an increased demand for spirit as to produce any shortage of supply, and so to lead to a rise in price.

The Committee summarises its recommendations as follows:—

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|---|--|
| <p>(i.) That an allowance be granted to all industrial spirit, whether of British or foreign origin, at the rate from time to time prevailing for the allowance to British plain spirits on export:</p> |  |
| <p><b>Summary of Recommendations.</b></p>   |  |

(ii.) That imported methylic alcohol be relieved from the obligation to pay the surtax imposed by the proviso to Section 8 of the Finance Act, 1902; and that methylic alcohol be accorded favourable treatment in the matter of denaturing:

(iii.) That "ordinary" methylated spirit should contain only 5 per cent. of wood-naphtha, instead of 10 per cent.

(iv.) That no charge should be made on manufacturers for the



regular attendance of Excise officers to supervise denaturing operations or the use of denatured spirit, in factories taking the benefit of Section 8 of the Finance Act, 1902.

(v.) That where spirit is allowed to be denatured with special agents such agents should be subject to official test and approval ; and that accounts should be kept by the user showing receipts of spirit into store, the issues thereof from store in detail, and the quantities of goods produced.

(vi.) That in the manufacture of fine chemicals and pharmaceutical products, spirit specially denatured should be allowed only where the manufacture is kept entirely separate from the manufacture of tinctures and other preparations in which spirit remains as spirit in the finished product.

(vii.) That the regulations governing the sale by retail of mineralised methylated spirit should be made less stringent and more elastic.

## THE FRUIT INDUSTRY OF GREAT BRITAIN.

The Department of Agriculture and Technical Instruction for Ireland held a Fruit Show, followed by a conference of fruit-growers and others, in October of last year. The proceedings, which evoked much interest and gave a needed stimulus to the fruit industry, were reported at length in the January issue of the Department's *Journal* (Vol. V., No. 2, p. 236). In view of the revived interest in fruit-growing, the following account of the state of the fruit industry of Great Britain, summarised from the Report\* of a Departmental Committee of the Board of Agriculture and Fisheries, may be useful.

As indicating the scope and nature of the inquiry, it may be pointed out the Committee met altogether 49 times, examined 61 witnesses, and that 11,968 questions were asked and answered. The witnesses consisted of officials from the Board of Agriculture and Fisheries, who were able to state the present condition of the industry, and to inform the Committee what measures had hitherto been taken by Government to promote it; of some of the County Council Horticultural Instructors, who explained what had been done so far by way of instruction by several of the County Councils; of fruit growers from all the principal fruit-growing districts in England, Scotland, and Wales; of salesmen from several of the largest distributing centres; of railway officials, who stated to what extent the railway companies had been able to meet the requirements of the industry; of land agents and surveyors, who dealt with the present state of the law with regard to land tenure, so far as it affects market gardens and fruit plantations; of officials of the Board of Trade, Somerset House, the Royal Agricultural Society, the British Bee-Keepers' Association, and other bodies, who gave evidence on special points brought before them. In addition to this the Committee heard several witnesses on the condition of the cider and jam industries, on the prosperity of which the fruit grower is largely dependent. In the selection of witnesses, the

\* C.I. 2589-1605.

Committee endeavoured to procure thoroughly representative men, by inviting various corporate bodies and local associations to delegate one of their members to give evidence. Besides hearing evidence, the Committee visited some of the chief fruit-growing districts, including Swanley in Kent, the large plantations at Todington in Gloucestershire, and the Evesham district. They also took the opportunity of seeing the National Fruit and Cider Institute, at Long Ashton, near Bristol, the Swanley Horticultural College, the East Sussex County Council Fruit Station at Uckfield, and, by the kindness of the Duke of Bedford, the Experimental Fruit Farm near Woburn, where a most interesting day was spent. The Chairman also paid a visit to the large strawberry plantation of Messrs. Bellis Bros., at Holt, Denbighshire.

It may be of advantage to begin by giving some figures showing the extent of the fruit-growing industry as it exists to-day. According to the official statistics, the total acreage under Orchards in 1904 was 243,008 acres, of which 236,705 were in England, 2,490 in Scotland, and 3,813 in Wales. These figures refer to orchards only, not to small fruit, though in many cases there would be small fruit under the orchard trees, but that is dealt with separately. These figures may be taken as fairly accurate, but, as they are compiled from Returns voluntarily made by owners and occupiers of land, there may be some omissions and inaccuracies, besides no account is taken of orchards in any holdings of less than an acre in extent, nor of the isolated trees and clumps constituting the remains of former orchards, so prevalent in Herefordshire and Devonshire, nor of fruit trees growing in hedge-rows, as in the case of the damson trees lining the hedges in the Holt district.

Turning next to Small Fruit, the total acreage in 1904 was 77,947 acres, 70,612 acres being in England, 6,072 in Scotland, and 1,263 in Wales. It should be stated, however, that these figures and those for orchards present to some extent a double return. Small fruit is very often grown in orchards, especially when the orchard trees are young; consequently the same land would in many cases be entered under the heading both of orchards and of small fruit—and it is not possible to obtain absolutely accurate figures of the total acreage under fruit generally, which, however, at the outside would probably not exceed 300,000 acres.

Though, however, this is but a small proportion of the total amount of cultivated land in Great Britain, the fruit industry appears to be a most progressive industry; in fact, it is the only form of agriculture which has exhibited any sign

**Progress of the Industry.** of progress in recent years. The Committee has indeed been much struck with the great increase in fruit-growing in the country. Taking orchards, there has been an increase from 148,221 acres in 1873, to 243,008 acres in 1904, or 63·9 per cent. in thirty-one years. Taking small fruit, there has been an increase from 69,792 acres in 1897, to 77,947 acres in 1904, or 11·7 per cent. in seven years. With this remarkable growth it is instructive to compare the decline of every other crop in Great Britain. For instance, it appears that there has been a decrease in the acreage of wheat from 2,564,237 acres in 1888, to 1,375,284 acres in 1904, or 46·3 per cent. in sixteen years; a decrease in the acreage of all corn crops from 8,187,758 acres in 1888, to 6,953,034 acres in 1904, or 15·0 per cent. in sixteen years; a decrease in green crops from 3,471,861 acres in 1888, to 3,036,026 acres in 1904, or 12·5 per cent. in sixteen years; a decrease in hops, from 58,494 acres in 1888, to 47,799 acres in 1904, or 18·2 per cent. in sixteen years.

In fact, the development of the fruit industry has come to the assistance of the farmer most opportunely in certain parts of England, notably in Kent, Middlesex, Worcestershire and Cambridgeshire, and, as more than one witness pointed out, much land which previously grew wheat is now planted with fruit.

Several important questions naturally arise in connection with this remarkable increase. The first is, what has been the cause of it? On this point some interesting evidence was given by Sir William Thiselton Dyer, Director of the Royal Botanic Gardens at Kew. He spoke of the extraordinary growth of the taste for fruit on the part of the public, a taste which, in his opinion, was not sufficiently provided for at present by fruit growers at home. There can be no doubt that fruit is becoming more and more a regular article of food for all classes, and it is probable that, except in special years of glut, the home supply has not kept pace with the demand, and that, as it increases, the demand will increase also. But it is not merely the consumption of fresh fruit which has largely increased. There is,

on the part of the public, a great and growing demand for jam, preserved fruits and cider. Mr. T. F. Blackwell, of the firm of Crosse & Blackwell, stated that "the demand for fruit in various forms grows quite as rapidly as the growth of fruit," and he also informed the Committee that "the taste for preserved fruit was growing enormously." Mr. Chivers, a jam manufacturer, at Histon, near Cambridge, testified to the extraordinary increase in the jam industry. As regards cider, there undoubtedly had been a falling off for many years, both in the public taste for it, and in its manufacture. This was probably due chiefly to the fact that the great vintage orchards in the West of England were rapidly becoming worn-out, many of them having been planted in the seventeenth century, and very little replanting having taken place since. In the last ten years, however, renewed attention has been paid to the industry; a considerable amount of planting has taken place of cider varieties of apples, especially in Herefordshire, and organised efforts have been made with considerable success to revive the trade. Mr. Bulmer, a cider-maker from Hereford, told the Committee that the taste for cider would soon be formed if only there were sufficient apples grown of the right sort.

### **The Prospects of the Industry.**

From the above it will be gathered, not only that the taste for fruit in various forms has grown very rapidly, but that there would appear to be room for a further extension of the industry. A question which was frequently put to witnesses by members of the Committee was "Is there a likelihood of the fruit industry being overdone?" The answer in the majority of cases was in the negative. Sir William Thiselton Dyer stated, that he thought the supply of home grown fruit was inadequate, and that, if home grown fruit could be distributed to the people more efficiently and more cheaply, it would be absorbed, and would be profitable to the cultivator. Mr. Best, a large Worcestershire grower, said that he thought much more fruit-growing might be undertaken in this country if the foreigner did not increase his as well. Mr. Kruse, a grower from Cornwall, took a similar view, and expressed the opinion that all the hardly fruit required by the people could be grown in the country. Mr. Collins Clayton, from Wisbech, described the industry as "still progressing and likely to progress." Mr. Wise, the agent to Mr. Andrews, the proprietor of the Todding-

ton estate, said that there was no fear of the industry being overdone "with better means of distribution." The same opinion was expressed by Mr. King, a Huntingdonshire grower, who said that he could double his business easily, and should do so if he could get the labour: by Mr. Pringle, a fruit salesman from Newcastle-upon-Tyne, who said that, if fruit culture was extended in this country, there would be a sale for the extra fruit thus grown at home, and probably a depreciated sale of the foreign, "because English fruit is preferable anywhere"; by Mr. Craze, who combines the business of a fruit grower in Cornwall with that of a fruit salesman in Liverpool, and who expressed the view that fruit-growing was not being overdone in the country, and that there was plenty of room for more cultivation. Other witnesses gave evidence to the same effect.

On the other hand, Mr. Berry, a Kentish grower, while recognising that the industry admitted of considerable extension, was of opinion that it might easily be overdone, unless the extension were made in the right direction; and Mr. Wood, of Swanley, pointed out that there was a very large acreage of fruit already planted which had not yet come into full bearing. Mr. Hughes, of Evesham, agreed with Mr. Berry that caution was necessary in extending the industry, though considerable extension was possible with strawberries; whereas Mr. Trevethan, from Devonshire, was against extension of strawberry-growing. Mr. Poupart, from Middlesex, was doubtful as to possible extension. As to cultivation under glass, the two witnesses examined—Mr. Rochford and Mr. Sams—both spoke of that branch of the industry as having been overdone already. It is, however, only necessary to consider the phenomenal increase in the consumption of fruit in recent years, and the fact that it seems to be steadily on the increase, to realise that further production in Great Britain would be possible. In the last thirty years, not only has this production been doubled, but our importation of fruit after deducting the re-exports) has risen from an insignificant quantity to the colossal amount of approximately thirteen million cwt. per annum; and so expansive has been the public taste for fruit, that this enormous increase in the supply has in many cases not affected the average prices realised to any appreciable extent. Having regard to all the evidence, the Committee feel that it is probable that a large extension of the industry at home might profitably be undertaken if carried out with judgment, and that, if certain difficulties and drawbacks are removed, fruit-growing may progress as rapidly in the future as it has been in the past.

The next question which arises is—would such an extension be beneficial to the country? Upon this the

**Is the Extension of  
Fruit Growing a  
Benefit to the Country?**

Committee think that there can hardly be two opinions. As has been already observed, fruit has taken the place of wheat in some districts where it has been found impossible to make wheat pay, and it is evident that the profits from fruit-growing, taking one year with another, are far greater than those from ordinary farming. It is undoubtedly the case that the planting of fruit greatly increases the value of land, as is shown by the high rents which land under the cultivation of fruit commands. When visiting the Evesham district, the Committee saw land which was let a few years ago for ordinary agricultural purposes at not more than £1 an acre, and is now fetching £6 an acre as a fruit plantation. Evidence of similar enhancement of value in Middlesex was given by Mr. Lobjoit, a grower from Hounslow, who said that he knew a piece of open land for which the rent was £3 an acre, while on the other side of the hedge there was similar land for which the tenant was paying £10 an acre, simply because it was under fruit; and Mr. Hodge stated that in the Blairgowrie district fruit-growing had increased the letting value of the land from 25s. an acre up to £4 to £12, and the selling value from £15 to £20 up to £50 to £100. Mr. Chivers also, representing the Wisbech district of Cambridgeshire, spoke of the increase in the value of land in consequence of the extension of fruit cultivation there. The same result is well known in all parts of the country where fruit is grown to any extent. Another beneficial effect of the planting of fruit is the great additional employment of labour in country districts which of necessity follows. A fruit plantation, especially if conducted on modern principles, employs far more labour than any other crop, with the possible exception of hops. Mr. Woods, of Swanley, a grower, not only of fruit on a very large scale, but also of hops, stated that fifty acres of fruit land properly cultivated would cost more money in labour than 1,000 acres of ordinary corn land, and he put the average labour bill down at about £25 an acre per annum, both in the case of fruit and hops. This view was confirmed by Mr. Pink, of Kingsdown, Kent, Mr. Clayton, of Wisbech, Mr. Wise, Mr. Craze, and many others. Mr. Pink's statement was remarkable; he said that the population of his parish, where fruit was not grown until he went there, had increased 25 per cent., and that, had fruit not been planted, he felt

sure that it would have declined by the same amount, through the falling off in the growth of corn, and he added that there was work for the people all through the winter. The Committee is of opinion that no better means can be devised for bringing people back to the land than an extension of the fruit industry, where it can be done profitably. Nor is this all. It should be remembered that, besides the regular labour employed all through the year, a great amount of extra labour is required during the picking season, which, in the case of fruit, lasts for three months—from about the middle of June to the middle of September—and this labour is obtained chiefly from London and other large towns and industrial centres, thus providing a splendid opportunity for many of the workers in these places of enjoying a most healthful and profitable change into the country. A great deal of labour is also employed in cider-making, jam-making and basket-making, which are the direct results of fruit-growing. Mr. Watkins, a Herefordshire grower, said that, although the cultivation of cider fruit does not employ very much labour in itself, the making of cider undoubtedly does. With regard to jam-making, the Committee had the advantage of visiting Messrs. Beach's factory on the Toddington estate, and can thus testify to the amount of labour which this industry employs. Referring to basket-making, the Committee was informed by Mr. Monro that the firm with which he dealt kept 40 to 50 men all the year round employed principally on his orders.

It may also be said that fruit-growing is in itself a most interesting pursuit, calculated to enlarge the mind both of employers and employed. This point was emphasised by Mr. Sheppard, who spoke of the intellectual growth of the labourer in the Holt district within the last thirty years, which he attributed, not merely to the general spread of education, but largely to the fact that the cultivation of fruit tended to bring out all the latent intelligence of those engaged in it. The Committee was greatly struck at Evesham with the intelligence and business capacity displayed by the members of the local Market Gardeners' Association, most of them growers on quite a small scale, and many of them men who had raised themselves from the position of labourers.

It may at this stage be interesting to give a short account of the principal districts, and the various classes of growers. With the exception of Kent and Worcestershire, the counties in which orchards most abound are situated in the West of England—

#### **The Principal Fruit Districts.**



Herefordshire, Gloucestershire, Somersetshire, and Devonshire. This district has long been celebrated for its apple and pear orchards, and is still the home of the cider and perry industry. Everybody acquainted with this part of the country has seen the old grass orchards, so beautiful in the spring, when the bloom is still on the trees, and in the autumn, when the fruit is matured. Many of these orchards are very old, the trees in Herefordshire, and doubtless in the other counties, having been planted as long ago as the end of the 17th century. Herefordshire, indeed, is described by Marshall in a work published in 1789, and entitled "The Rural Economy of Gloucestershire, including the Management of Orchards and Fruit Liquor in Herefordshire," as "a forest of fruit trees." The great bulk of the fruit grown is vintage fruit (*i.e.*, grown for cider and perry making): in Herefordshire 75 per cent. was stated to be of this character, and a similar proportion would probably hold good for Somersetshire and Devonshire. Scarcely a farm in these districts is without its orchard. The cider used to be entirely home-made, the cider press, like the orchard, being a necessary part of every farm. In recent years, however, the factory system has been introduced, with, apparently, good results. But a great deal of cider is still made at home. The cultivation of these old orchards is a very different matter from that of the modern fruit plantation. Very little labour is necessary; even picking is dispensed with, the fruit being generally shaken down: indeed, it must be admitted that, in many parts, the orchards have been terribly neglected—notably in Devonshire. Replanting is urgently needed, though a certain amount has been undertaken in Herefordshire recently. But these orchards are still profitable—the cider fruit fetches a good price as a rule, and the trees standing in grass afford shade for sheep which graze in the orchards. The growers in these counties are generally not "fruit growers" in a specific sense—they are ordinary farmers, whose farms consist to a greater or less extent of orchard; but, having regard to the larger profits made elsewhere by fruit growers, it may well be surmised that, if they devoted more time and labour to their fruit, and took more interest in it, they would largely improve the value of their holdings and their yearly profits. It is specially worthy of notice that, where replanting occurs, the demand is largely for good varieties of market fruit, and that, in some cases, the farmers exhibit a tendency to develop into professional fruit growers, and to adopt the higher methods of cultivation. There are many growers in Here-

fordshire, whose main object is the production of cider fruit, and in all these counties there are districts where mixed plantations exist, and where all hardy fruits are grown upon the most scientific principles. The most conspicuous example of this is the great fruit farm at Toddington, in Gloucestershire, started by Lord Sudeley in 1883, and now the property of Mr. Andrews, where there are between 600 and 700 acres actually under fruit—producing in some years a total of over 2,000 tons of fruit—apples, plums, damsons, pears, cherries, strawberries, raspberries, black and red currants, gooseberries and nuts. Other examples which may be given are the Tamar Valley, in Devonshire, and, going further west, many parts of Cornwall, where, thanks to the climate, strawberries and other fruit ripen a week or a fortnight earlier than in most English districts.

Turning to a totally different part of England, we find the county of Kent standing at the head of the list as regards the acreage, both of orchards and small fruit—its pre-eminence in the latter being, indeed, most marked—with 22,549 acres to its credit: Middlesex coming next with 4,700. Kent has, of course, special advantages in respect of its proximity to London, which enables growers, particularly in West Kent, to send their fruit easily and cheaply to the London markets, and also to get down large amounts of stable manure. Indeed, so far as the Swanley district is concerned, railway carriage is dispensed with almost entirely for these purposes, the roads being used, and motor haulage being employed more and more each year. In Kent every class of grower and of plantation is found, from the ordinary farmer with the old grass orchard, to the highly-specialised fruit-grower, having possibly 500 to 1,000 acres of fruit, in mixed plantations. A good deal of the highest class of fruit is also grown under glass at Swanley. Speaking generally, however, it may be said that large holdings prevail in Kent, and that very little vintage fruit is grown, it being found more profitable to grow apples for the table than for cider-making. Another county conspicuous for its fruit-growing is Worcestershire. Worcestershire, indeed, seems to combine many of the characteristics of the West of England with the large mixed plantations of Kent and other districts. Very interesting evidence of a large fruit farm, comparable only with some of the Kent plantations, or with Toddington, was given by Mr. Best of Suckley, near Worcester. But the most remarkable feature in Worcestershire is to be found at Evesham. Here is an area of many thousand acres stretching in

every direction from the town of Evesham, devoted to the cultivation of fruit, flowers and vegetables, and mostly divided into small holdings, varying from two to twenty acres. The cultivation is of a high order, and the whole is a remarkable example of what can be effected on small holdings by industry and skill. All the hardy fruits are grown, the plum predominating. Other notable fruit-growing districts in England are Middlesex, where a great deal of small fruit has been planted in recent years, and where there is also a considerable acreage of orchards; Norfolk, where the cider industry of the West is reproduced, to some extent, in the East; and Cambridgeshire, where, though the acreage is not very large at present (orchards, 3,732 acres; small fruit, 4,403 acres), there has been a greater increase than in any other county, amounting to no less than 88 per cent. in the case of orchards during the past twenty years, and 56 per cent. in the case of small fruit during the past six years. This increase has been chiefly in the Wisbech district, where, as at Evesham, small holdings generally prevail, though here the fruit grower has been able in many cases to buy his own holding, whereas at Evesham he is generally a tenant. There are, of course, many other counties which grow fruit in a greater or lesser degree, but not to such an extent as to cause it to occupy a leading position among the industries of the county; but an exception must be made of the very large business, employing capital and labour altogether out of proportion to its acreage, of growing fruit under glass, which has sprung up, especially in the Lea Valley in Hertfordshire, and in the neighbourhood of Worthing in Sussex. The same industry is also extensively carried on in the island of Guernsey, from which the Committee received some interesting evidence, although, strictly speaking, the condition of affairs in the Channel Island is a little beyond the limits of their Reference.

Turning now to Scotland and Wales, the amount of fruit grown in these countries is small compared with

**Fruit Growing in  
Scotland and Wales.**

that grown in England. In certain parts of Scotland, however, fruit-growing has gone ahead, and is an important local industry—notably in the Clyde Valley and in the Blairgowrie district of Perthshire. The climate of the Clyde Valley seems well adapted to the growth of fruit, especially strawberries, while tomatoes are grown under glass. In the Blairgowrie district the industry is rapidly progressing, raspberries being a speciality.

A very interesting account of the Blairgowrie and Rattray Fruit-Growers' Association was given by Mr. Hodge, a member of the Committee; small holdings, as at Evesham and Wisbech, prevailing here also. In Wales there are a considerable number of old grass orchards, especially in the counties of Brecon, Montgomery and Radnor. The small fruit grown is insignificant in amount, and is almost entirely confined to the Holt district, in the Dee Valley in Denbighshire, which county claims 741 acres out of a total of 1,263. The strawberry is almost the only fruit grown. Here the industry is in a progressive state.

There can be but little doubt that there is abundance of land in other districts where fruit-growing might be profitably undertaken, especially as its establishment in many cases has been the result of adventitious circumstances, such as cheap carriage—due to the competition of railways—the proximity of a good market, facilities in obtaining land from the landowners, or the presence of some one enterprising individual.

It will be seen from what has been already said that the cultivation of fruit, though but a small part of agriculture generally, especially if judged by acreage alone, is a growing industry in Great Britain, and that its increase in recent years has been remarkable. The opinion, also, that still more fruit might be advantageously grown, provided that certain difficulties and disabilities were removed, and if extension were directed into the proper channels, would seem to be well founded. Nearly all the witnesses argued that the British grower was unfairly handicapped in some respects at the present moment, though their grievances differed very largely, some laying stress on one thing, and some on another; and their suggested remedies differed even more widely. The Committee have thought it well to analyse these grievances, and propose to deal with each in turn, and to consider how far any of these remedies would be likely to prove effectual, and might with advantage be recommended.

The disadvantages under which the industry is alleged to labour now may be classified as follows:—

**I. Insufficiency of knowledge, especially in regard to:**

- (a) The right kinds and varieties of fruit to plant.
- (b) The character of the soil, and the effect of manuring.
- (c) The pruning and the general treatment of fruit trees.

(d) Diseases and insects pests, and the methods of combating them.

(e) Packing and grading.

II. Land tenure.

III. Taxation grievances—alleged excessive and unfair valuation of fruit holdings for the purpose of local rates and Imperial taxation.

IV. Railway grievances—complaints of excessive rates, preferential rates, unpunctual deliveries, bad handling, pilfering, inadequate service and refusal to pay claims.

V. Foreign competition, and tariffs hostile to British fruit.

VI. The insufficient inspection of fruit—especially of foreign fruit.

VII. The difficulty of obtaining labour in country districts.

VIII. The insufficiency of markets, and other market grievances.

IX. The ravages of birds.

X. The effect of the rise in the price of sugar on the jam industry.

The Committee conclude their labours by adding a list of the recommendations and suggestions which they make.

#### RECOMMENDATIONS AND SUGGESTIONS MADE BY THE COMMITTEE.

That a special sub-Department of the Board of Agriculture and Fisheries be established to deal with matters connected with the fruit industry. That

**State Aid.** there be two branches of such sub-Department; (a) a bureau of information; (b) an experimental fruit farm.

That after the establishment of the Government sub-Department, its attention be directed to the necessity of preventing the importation of diseases and insect pests through the importation of diseased fruit and nursery stock.

That the question as to the desirability of setting up compulsory powers for the eradication of diseases and insect pests in this country be postponed until we are in possession of fuller knowledge through the work of the Government sub-Department.

That horticulture be taught in elementary schools in country districts, and that such schools should have school gardens attached wherever possible. That the attention of Local Education Authorities should be called to this, and also to the desirability of encouraging the study of practical horticulture in training colleges.

That the present defective form of returns made by growers for land under fruit should be improved and amplified.

That estimates of home and foreign crops should be published, together with forecasts of the probable date of arrival of imports.

That the Market Gardeners' Compensation Acts be amended by making Section 4 retrospective.

That Rule No. 8 for the assessment for income tax, whereby market gardens and nurseries are assessed for Schedule B. according to the rules of schedule D., be repealed so far as it applies to market gardens.

That in the assessing of agricultural holdings for local rates, the assessments should not be raised by reason of the planting of fruit for a period of five years after the planting in the case of small fruit, of seven years in the case of mixed plantations, and twelve years in the case of orchards.

That in the case of glass-houses, the allowance of one-sixth, given to dwelling-houses for repairs in the assessment for income tax, be increased to one-third, by making a special allowance of one-sixth for renewal, in addition to the one-sixth for repairs.

That the benefits of the Agricultural Rates Act of 1896 be extended to glass-houses used for commercial purposes.

That it is highly desirable that a more simple and uniform system of rates for fruit be introduced by the railway companies. This can be done without a statutory re-classification, with the assistance of the Board of Trade.

The Railway Companies should make greater efforts for ensuring the prompt delivery of perishable fruit.

That railway companies be urged to provide suitably ventilated goods vans for fruit traffic, similar to those

**Transit.** recently introduced by the Midland Railway. That sheeted trucks without sheet

supporters should never be used.

That it is most desirable that all fruit be consigned at company's risk, and that the so-called owner's risk rates be abolished; the rates at company's risk being reduced to a figure approximating to those now in force at owner's risk, but providing the companies with just a sufficient margin for the extra liability incurred. That 5 per cent. would be a fair margin.

That, in the event of owner's risk rates being retained, the liability of the Railway Companies should not be confined to cases where only wilful misconduct, but to those where culpable negligence, can be proved.

The Committee also suggest that, in view of the recent tendency to combine among the railways, it would be an advantage if the Government were to appoint an official or a Department to watch over the companies' actions, and to report to Parliament.

That in the cases of all serious grievances against the railway companies, growers and merchants should at once send their complaints to the Railway Department of the Board of Trade, and ask them to exercise their powers under the Conciliation Clause of the Act of 1888.

That in years of glut, railway companies should be urged to temporarily lower their rates for fruit, just as excursion passenger fares are lowered on special occasions, and that, if this cannot be done by agreement, it is desirable that the Railway and Canal Traffic Act of 1894 should be amended for that purpose.

That jam made wholly or in part from foreign fruit be so labelled.

That the Government should undertake the inspection of imported fruit and fruit pulp at the ports of entry.

That it would be an advantage to fruit growers and to the public generally, if the Local Government Board collected statistics of the fruit seized and condemned as unfit for food.

That boys in industrial schools be allowed to stay away from such schools for the purpose of fruit-picking, subject to suitable regulations.

#### **Labour.**

That the provisions of the Robson Act as to "half-timers" be made generally known, and applied by Local Education Authorities in country districts.

That with regard to markets, it is desirable that a greater number of local markets, similar to that of Kew Bridge, be established in the suburbs of London. That as regards the large dis-

#### **Markets.**

tributing markets in provincial centres, it is desirable that certain of these be extended and improved. That the provision of retail markets in many country towns is urgently needed, and that very good results would be likely to follow if the Councils of other towns followed the example set by Hereford in establishing a fruit market under their own authority.

That the telephone should be further extended in country districts.

That County Councils, in the publication of any orders made by the Home Secretary on their application

**Miscellaneous.** under the Wild Birds' Protection Acts, should clearly state the powers belonging to owners and occupiers of land under these Acts.

That it is desirable that an inquiry be instituted into the alleged practice of growing fruit on sewage farms, and the effect of such a practice on the public health.

That fruit growers should pay more attention to the careful packing and proper grading of better-class fruit, and to the selection of the right kinds of fruit to plant according to the soil, and to the importance of cultivating fewer varieties, especially of apples.

That the establishment of co-operative societies, similar to that existing at Blairgowrie, for the disposal of fruit, and for other purposes, such as the obtaining of adequate supplies of pickers, would be beneficial, particularly in districts where there are many small holdings.

That it would be an advantage to fruit growers if they kept bees in connection with their fruit plantations.

The Committee are also of opinion that, in connection with the proposed Government sub-Department, it might also be advantageous that a large fruit farm should be established in proximity to the experimental farm, where fruit growers and lecturers could receive a practical training.



## NAVEL ILL OR SPECIFIC ARTHRITIS OF LAMBS.

\* \* NOTE —*Copies of this article, which has been issued as a leaflet (No. 130) by the Board of Agriculture and Fisheries, may be obtained free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.*

This disease is met with, under such local names as Big Joint, Joint Evil, Schooley, in most parts of the British Isles.

The disease is caused by the entrance into the system of the newly-born lamb, through its unclosed navel, of germs whose special function is the formation of pus or matter. These germs are widely distributed in nature, but are found in greater numbers and probably in a more virulent form on those spots frequently soiled by animals, such as farm-yards, lambing yards, &c., than in the fields. For this reason a permanent lambing shed or a site for a temporary yard used continually is a more dangerous place than the pastures.

The lambs are noticed a few days after birth to be moving stiffly and to be disinclined to walk or suck. They lie down continually, and with difficulty are got on their legs. Their joints begin to swell, and often it is apparent that abscesses have formed on them—the hock, stifle, point of the shoulder and knee being the joints usually affected. In the worst cases abscesses form in different parts of the body (particularly the kidney and liver), and kill the lamb by exhaustion or by the poisons elaborated by the germs of the disease.

Every outbreak on a farm adds greatly to the number of these germs, and so increases the probability of future attacks. On the other hand, if outbreaks are prevented, the germs become fewer in number and may ultimately be reduced to a negligible quantity.

A site for lambing the ewes must be chosen as free from infective material as possible, and there is no doubt, other things been equal, that ewes lambing in the fields rear a greater number of lambs than in

temporary or permanent lambing yards. Shelter, if necessary, can be provided by strawed hurdles set up about the fields in the form of a cross, or arranged to break the prevailing winds. The lambing field should, if possible, be changed each year.

The system in vogue in some counties of passing the whole flock of ewes, if a big one, through one lambing yard cannot be too severely condemned. A large flock should be split into as many divisions as convenience will allow; it is then possible to confine disease to the divisions in which it occurs. If the lambing yard system is adopted it is imperative that a fresh site should be chosen each year.

All dead lambs and the membranes in which they are born should be buried promptly. Straw on hurdles and for bedding should be renewed occasionally, and hurdles should be lime-washed. Manure and straw from hurdles should be placed in a heap, fenced off from the ewes, and should never go on to sheep pastures. At the end of the season the site of the yard should be sprinkled with lime and the hurdles lime-washed.

In addition to these preventive measures, care should be taken that the shepherd does not carry disease from ewe to lamb or from lamb to lamb. A shepherd's hands must be continually and scrupulously cleansed; washing with soap and water is not enough, they must also be disinfected. Nails should be kept short and scrubbed with a nail brush. His clothes should be covered with a lambing coat which can be washed. Dead ewes or lambs should not be skinned by the shepherd. A little disinfectant should be applied to the navel of each lamb immediately after birth. Stockholm tar has been found useful for this purpose. A ewe which has given birth to a dead lamb should not be allowed to run with the healthy ewes and lambs.

If an outbreak should occur the attacked lambs, with their mothers, should be isolated on a spot not likely to be

#### **Treatment.**

used for sheep for some time. If only a few lambs are attacked it will be found cheaper to kill them and dry off the ewes, as only a few attacked lambs grow into sheep which show a profit. If a large number are attacked, as many as possible must be saved, and it is then worth while getting a man to nurse them who does not go near the healthy flock. Bottle feeding will be necessary for the worst cases, and care must be taken that a lamb does not lie always on one side, as the limbs of that side are likely to waste or become paralysed.

If a ewe loses her lamb it is not safe in this disease to "split a double" and mother one on to her, as this lamb often becomes attacked, and the expedient of putting the skin of a ewe's dead lamb on to a lamb to be adopted by her must not be resorted to.

Ewes which have lost their lambs should be carefully watched, as it is possible that germs from the lamb may have found their way into her teats and produced inflammation of the udder, which, if it does not kill the ewe, will probably prevent the gland secreting milk in the future, and so render her unfit to breed again.

The site of the lambing yard in which the diseased lambs got infected should be immediately changed, and the hurdles re-strawed and disinfected. If a field is thought to be responsible, then move the sheep on to fresh ground. In this way it is possible to avert a serious outbreak.

## MANGE IN CATTLE.

**\*\* NOTE.**—*Copies of this Article, which has been issued as a Leaflet (No. 135) by the Board of Agriculture and Fisheries, may be obtained, free of charge, and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.*

Mange is a contagious skin disease caused by parasites belonging to the class of psoric acari.

Three forms of mange occur in cattle, viz, *sarcoptic psoroptic* and *symbiotic*. These forms are named after the

**Definition.** variety of parasite which is the cause of the ailment. Sarcoptic mange in cattle is un-

common. The most prevalent forms are the psoroptic and symbiotic, and these frequently exist together in the same animal. Cows are most often attacked.

The most common sites of mange are the root of the tail and the neck, especially the former. The psoroptic

**Symptoms.** form may spread all over the body if treatment is neglected, but usually it does not.

The biting of the parasites gives rise to an itchy condition of the skin, which causes the animal to rub itself against fixed objects, with the result that the hair over the affected part gets rubbed off. On examining the skin a considerable amount of scurf may be seen. Red and yellow blood scabs appear on the surface, and there may even be abrasions if the animal has been rubbing against rough objects. If the psoroptic form should spread over the body the patient may waste away and become greatly reduced in condition. In cases of this kind, however, it will often be found that the wasting is due to some serious internal trouble such as tuberculosis, which reduces the animal's natural power of resistance to the less serious disease.

It has not infrequently been observed that cows appear to become cured spontaneously when turned out to grass in the spring. This usually means, however, that under open air conditions the parasites do not increase at the same rate, hence the active symptoms are merely less marked. When the animals are again stabled in the autumn the

acari (parasites) which have persisted resume their activity, and this sometimes leads to an erroneous belief that re-infection has taken place.

- (1.) The affected patches on the animal's skin should be softened by washing with soap and warm water. After

**Prevention.** this has been done the parts should be dressed with one of the common mange dressings, such as spirit of tar, oil, and sulphur. The dressing should be applied twice or even three times at intervals of ten days. For the serious and rebellious cases above mentioned veterinary advice should be sought.

- (2.) The litter from an infected animal should be removed each time after dressing, and the flooring and wood or other fittings should be well sprayed with a five per cent. solution of carbolic acid in water.

## LABOURERS' HOLDINGS IN DENMARK.

An Act has just been passed by the Danish Legislature for providing plots of land for labourers. In accordance with the terms of the Act, a Committee is to be organised in every County Council Division to co-operate in procuring and supervising plots of land for labourers. The Committee is to consist of three persons, of whom one, who will act as President, is to be chosen by the Minister of Agriculture, the two others, of whom one must be a cottager, by the County Council. The members will be elected for six years, but may be re-elected. One of the members must retire every second year.

The expenses of the Committee shall be paid by the Treasury.

By "labourers" will be comprised in this law every male who substantially maintains himself by performing

### The Definition of "Labourer."

ing for compensation ordinary agricultural labour, including garden work for another person, whether he be in settled employment or in receipt of daily wages, or who has been or is tenant, lessee or renter of a property similar in size to those mentioned in this law, and further, mechanics, tile workers and others who are of a similar financial standing, and who partly subsist on ordinary agricultural work.

Permission to obtain land by the terms of this law is granted under the conditions that the labourer in question

### Conditions required for obtaining Grants of Land.

(a) is a Danish subject by naturalisation or by birth ; -

(b) is at least 25 years of age, and, as a rule, not over 50 years of age ;

(c) has not been found guilty of an ignominious crime, in the ordinary sense of the word, of which he has not been subsequently honourably cleared ;

(d) has not received poor-law relief which has not been repaid or remitted in accordance with the Poor Law of 9th April, 1891, Section 35.

(e) has earned his living as a labourer for at least five years, in which is comprised the time during which he has performed his obligatory military service, and other smaller intervals, which latter, taken together, do not exceed one year ;

(f) can produce a certificate from several trustworthy people thoroughly acquainted with his position, that he is an industrious, sober and frugal person, so that he may be expected to assume such a cottager's position;

(g) can show that he is in possession of means that, in accordance with this law, will be necessary to enable him to take over his property;

(h) is unable by his own means to acquire a property of the species described in this law.

Compliance with the above conditions must be attested before the above-named Committee by such papers and vouchers of which the petitioner can generally be supposed to be in possession, and especially by a declaration truly and lawfully subscribed by him that the evidence in question is in accordance with the truth. The attestations and evidence of the private persons referred to shall be accompanied, if necessary, by the attestation of the authorities of the trustworthiness of his guarantors. In addition, the petitioner must produce a certificate from the authorities where he resides that he is supposed to be qualified to manage a cottager's property.

The parcels of land acquired for the object herein dealt with must not be less than 2 tønder, geometrical measure, and not larger than 8 tønder, geometrical measure, (1 tønde = 1,360 acres). In the less fertile portions of the country the lots may have a larger area. If plots are to be of more than 12 tønder the sanction of the Minister of Agriculture must be obtained.

When a labourer who has fulfilled the conditions required wishes to enter into possession of an allotment in

**How Plots are  
obtained.**

accordance with the regulations of this law, but is not himself in a position to point out the land of which he can get possession by arrangement with its owner, the application shall be made by the Communal Council, who shall endeavour to make a bargain with a proprietor on reasonable terms. Should this not succeed, and should the Communal Council find that there is land of the 'Commune' belonging to the public domain fit for this purpose, negotiations shall be carried on with the authority of the County Council concerned, for the transfer of the necessary land at a proper price. The Communal Council shall give the labourer in question information respecting the result of these negotiations

and he is then left to himself, as soon as a promise has been given about handing over the land, to conclude the further necessary arrangements for its acquisition in accordance with the regulations mentioned below.

Ground which is owned by offices or services, asylums or churches may be sold as cottagers' properties in accordance with this law. The ground may then be acquired in such a way that a yearly payment is taken as part of the purchase sum. The sanction of the authorities must be obtained and the payment must not exceed 10 kroner per tønde. This mortgage has priority over the State loan, which is to be obtained.

The Communal Council must take care that the plots of land that are procured by this arrangement are easily accessible from the high road.

The Communal Council's communications to the authorities concerned in the above business shall be made through the County Council.

Whenever a labourer has selected, either himself or by the help of the Communal Council, a plot of land within the area laid down of which he wishes to enter into possession according to the terms prescribed in this law, he shall present through the Communal Council his petition respecting it to the chairman of the Committee in the County Council District. This petition, to which forms drawn up after a given formula by the Minister of Agriculture shall be annexed by the Communal Council, must contain all the information necessary to allow a judgment to be formed as to whether the labourer is worthy of having his request considered, and must be accompanied by the certificates of identity and the other required documents, which the petitioner must produce. The petition must moreover contain information as to the approximative size of the parcel of land, the amount of the purchase money offered, and (if the applicant does not already possess the buildings deemed sufficient by the Communal Council) be accompanied by plans for the necessary buildings. The petition must also make mention of the capital sum which the petitioner intends to devote to the said buildings, as well as an estimate of the expense necessary for the proper supply of cattle, tools, &c. The total sum which the property will eventually cost the purchaser (the mortgage value of the property estimated by the State Treasury) must only exceed in exceptional cases, where the price of land is particularly high, the sum of 5,000 kroner. The



petition must be accompanied by a declaration of the Communal Council stating whether the land selected is suitable, and whether the purchase price is acceptable.

It will be the duty of the President of the Committee to provisionally examine the details obtained, and to endeavour to complete this by means of any other information that he may deem necessary.

It will be the duty of the Committee to examine the petitions presented, and to see that the conditions laid down are fulfilled; that the building plans are well drawn up; that there is a road leading to the allotment, easily accessible from the high-road and, if there is no well on the property, that there is a legal guarantee that water can always be obtained. The Committee must then survey the plot and ascertain if the plot is suitable as a cottager's property and if the price asked is reasonable. If the petitioner possesses buildings, which he intends to join with the plot, the Committee must further ascertain whether the buildings are in proper condition and shall assess their value.

If the Committee should resolve that a petition for a State loan cannot be granted the petitioner is to be informed of the reason of the refusal. If the reason of the refusal is that the Committee considers the mortgage value of the property too high, or that the petitioner has not fulfilled the required conditions, the petitioner can appeal from the decision to the Minister of Agriculture. A petitioner whose claim has been dismissed cannot appeal to the courts of law.

If it so happens that the total sum annually placed at the disposal of the County Council is not sufficient to meet the requirements of the petitioners who fulfil the necessary conditions, the Council shall choose between them. Those who have been thus omitted shall have priority of consideration in the following year if they renew the request and still fulfil the necessary conditions.

As soon as a decision has been taken each petitioner shall be informed of the result in so far as he is concerned.

When a labourer has been informed by the Committee that permission has been given to him to have recourse to State help for the acquisition of land in conformity with the terms of this law, and that no objection is taken to the building plans sent in, and if it be certain from the declaration of the Committee to the Minister of Agriculture that the buildings on the property are

well constructed, and that the property is supplied with cattle and implements, the person concerned can, by

**Loans  
for Purchase.**

addressing himself to the Committee, claim a loan from the State equal to nine-tenths of the mortgage value of the property. The

State loan must not exceed the amount of the purchase sum of the plot together with the cost of erecting the buildings or the value of the buildings which already belong to the labourer. Should the amount of the loan be higher it must be reduced accordingly.

If the property has charges on it the redemption of the charges shall be deducted from the State loan. However, taxes to State and Municipality, tithe and bank charges shall be excepted.

The capital sum of the charge shall be fixed by multiplying the yearly rent by 25. If the rent is paid in corn the money value shall be estimated by the average price of the produce for the last eight years, omitting the highest and the lowest year. If there is a charge on the property together with other properties, and the mortgagor will not separate the charges, the capital sum of the charge in proportion to the size of the property shall be paid to the mortgagor, and the State loan shall for this purpose be increased by a corresponding amount.

The Government shall hold a mortgage on the property with its buildings and animals, &c., as security for the loan made, but only as a second charge in case of there already being other charges. The interest on the loan shall be 3 per cent. The loan shall not pay for redemption of principal during the first five years. After that time the two-fifths, which are latest mortgaged, of the money advanced shall pay for interest and repayment of principal 4 per cent. annually. When this part of the loan has been repaid in this way, the rest of the loan shall be repaid and interest paid by a total payment of 4 per cent. annually. The loan cannot be called in by the creditor as long as the property is managed according to these conditions.

The Treasury may set aside every year for five years 3,000,000 kroner for the purpose of the State loan, which shall be divided during each financial year between the various Counties in proportion to the demand of loans. If the sum voted for one year is not spent the surplus shall be carried over to the next year.

That part of the loans which is first to be repaid is to be advanced by the State Loan Fund. The other part of the loans is to be advanced by the two Trust Societies for owners of small properties in the country established by Law No. 65 of May 28th, 1880, the necessary alterations in the aforesaid law and the statutes of the Societies having first been made. The Treasury is empowered to pay the Trust Societies for losses which might occur when a higher interest than 3 per cent. is payable on the bonds.

The interest on the loans is to be paid half-yearly. If a borrower desires to pay off the loan in a larger sum for one term, he shall be allowed to do so if the excess sum is at least 50 kroner. The dues payable shall be paid half-yearly at the same time and place as the charges due to the Treasury. The Treasury and the other creditors have the right of distraint in order to recover their advances.

Stamped paper costing 1 krone must be employed for the sale of land to labourers under the present law. On the other hand the mortgage bonds will be emitted on unstamped paper. The fees for registration and other fees due to the Treasury will not be enforced.

Any person who has been entrusted with a property on the above-mentioned conditions will have an owner's full title to it with the special restrictions and rights mentioned below.

A loan from the State Treasury in accordance with the present law cannot be granted to anybody on more

**Conditions of  
Ownership.**

than one property. The person who transfers to another person a property with which he has been entrusted in accordance with the present law, cannot repeatedly benefit by the law.

As long as the Treasury's claim exceeds the half of the property's original mortgage value, the property with live stock and implements cannot be charged with other mortgages. The effects mentioned cannot be distrained, seized or sequestrated for personal debt contracted by the owner or anybody on his behalf unless the consent of the Minister of Agriculture has first been granted.

There must be a clause in the deed of mortgage stating that if the owner moves from the property or lets out any part of the plot or builds houses on it for letting purposes, notice can be given to the owner to repay the loan after six months' notice, to be paid, at a June or December term.

The soil on the property must be cultivated in the customary manner and the necessary live stock, implements and buildings must always be kept up and maintained in good order.

The owner must afford the County Committee opportunity for ensuring the performance of this duty, and to this effect must permit one or more members of the Committee to survey the property. Such survey must be held at least every third year, and if any essential deficiencies in the property or in its management are found, the owner will be liable within a limit of time fixed by the County Committee to set these to rights. If he has not done so within the time fixed, the Committee shall report the matter to the Minister of Agriculture, who will decide what steps should be taken against the mortgagee in accordance with the conditions of the deed of mortgage.

The owner shall keep the buildings belonging to the property, the live stock and implements and all his other property insured against fire for the full value; the immovable property in a fire insurance company recognized by the State. Care must be taken at the surveys held on the property that this liability is attended to.

The property must not be parcelled out, joined with other ground or given in exchange for other ground without the special consent of the Minister of Agriculture, which will only be given, if an application has been recommended by the Communal Council.

Consent to parcelling out may be given, if general economical circumstances, the state of settlements in the community or similar reasons make it advisable that the plot in question should be used otherwise than originally granted, either wholly or partly.

Consent may be given to join the plot to other land if circumstances make it advisable that the wish of the labourer concerned to extend the scope of his work should be granted. However, the plot thus formed must not exceed the fixed maximum, and the whole plot shall then be considered and registered as coming under the rules of the present law.

Consent to exchange a plot or part of a plot for another plot may be given, if there is reason to believe that this would be more advantageous. If a plot is to be exchanged for other land, and the liabilities are to be transferred in conformity with this law, a statement must be produced showing that the plot to which the liability is transferred is just as good and serves the same purpose as the one which it is desired to abandon.

The conditions for the settlement of the debts on the State Treasury on account of parcelling out, joining and exchanging, are to be fixed by the Minister of Agriculture on a recommendation from the County Committee.

If the owner desires, during his lifetime, to transfer the whole property to another person, the purchaser  
**Transfer of Title.** can take the place of the owner as regards the liabilities to the Treasury, if he fulfils the conditions mentioned above. Certain of the conditions may be waived if it is desired to transfer the property to a son or a son-in-law, or a child of either. A transfer of the property to a person who does not fulfil these conditions can only be effected if the debt to the Treasury is fully paid at once. However, the property, having been transferred, shall still be considered a plot under the regulations of the present law.

If the owner dies, his widow can take his place as regards his obligations to the Treasury, provided she desires to keep the property, but if the widow marries again, the property can only be kept if the husband fulfils the conditions mentioned above.

The rules contained in ordinance of May 13th, 1769, Section 5, and later publications concerning the testamentary right of freeholders shall also apply as regards testamentary dispositions concerning these houses. If the testamentary right is applied to the advantage of one of the children, the person who is to inherit the house with plot according to the decision of the cottager and his wife, may replace the testator as regards his obligations to the Treasury, but only if the sum which the heir has to pay to the estate and the co-heirs for taking over the property has not been fixed in the will higher than an amount corresponding to what has been paid by the testator as repayment of the mortgage debt at the time the heritage took place.

If the transferee does not himself possess means to pay the amount he has to pay to the co-heirs, a mortgage on the property may be given to these latter after the Treasury, provided that they submit to reasonable terms as regards charging interest and repayment. These terms shall first be approved by the County Committee.

If there are legitimate heirs to the deceased, who fulfil the conditions laid down, the testamentary right can only be applied to the benefit of one of these.

If the person to whom the property has been left by will does not wish to become owner of the property, or if no decision has been laid down to this effect by will, one of the heirs may replace the deceased as regards his obligations to the Treasury, provided that he fulfils the conditions and makes an agreement with his co-heirs for taking over the property.

If the property is sold, the Minister of Agriculture may permit the buyer to replace the deceased as regards his obligations to the Treasury.

If the Treasury, after having put in an execution should prefer to sell the property, this can be done without any regard being had to the restrictions mentioned in the present law concerning the disposal of same.

# OFFICIAL DOCUMENTS.

## I.—AGRICULTURE.

### INSTRUCTION IN DAIRYING.

DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET, DUBLIN,  
May, 1905.

No. 11,751/'05.

SIR,—With a view to increase the existing facilities for obtaining technical advice and assistance in the management of creameries, the Department are at present making arrangements by which proprietors of creameries and auxiliaries can have their dairies periodically visited free of charge by Instructors in Dairying, appointed by the Department. Under the proposed arrangements all creameries and auxiliaries, whether co-operative, proprietary, or joint stock, and whether entered for Registration or not, from which applications are duly received and accepted by the Department, will be visited regularly by the Department's Instructors. On the occasion of each visit all necessary advice will be afforded on matters relating to the dairying operations carried on in the creamery.

It is to be clearly understood that the visits of the Instructors will be quite distinct from the Inspections of creameries for the purpose of Registration under the Department's Scheme for the Improvement in the Management of Creameries. At the same time, all creameries entered for Registration, in addition to being inspected for the purposes of the Scheme, will receive visits from the Department's Instructors.

In the event of you desiring to have the creamery with which you are concerned included in the list of those to be visited by the Department's Instructors, you are requested to make application to the Department on the accompanying Form\* which may be transmitted to this Office, free of postage, in the enclosed envelope.

I am, Sir,

Your obedient Servant,

T. P. GILL,

*Secretary.*

To

The Proprietor, Chairman, or General Manager of  
the Creamery or Auxiliary mentioned in the Address.

\* See copy of Form  $\frac{A}{176}$  on opposite page.

\* Name of Creamery.....

State whether Auxiliary or Central .....

Postal Address .....

.....

.....

Telegraphic Address .....

Railway Station and } .....distance.....statute miles.  
distance therefrom }

Name of Manager .....

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SIR,—I desire to have the above-named Creamery placed on the list of Dairies to be visited regularly by the Department's Instructors in Dairying.

I am, Sir,

Yours faithfully,

Signature.....

State whether Proprietor, }  
Chairman, Manager, } .....  
or Secretary. }

To the Secretary,

Department of Agriculture and

Technical Instruction for Ireland,

Upper Merrion-street, Dublin.

\* Please fill in particulars required under these heads clearly and in full.



# THE ALBERT AGRICULTURAL COLLEGE, GLASNEVIN, DUBLIN.

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SESSION 1905-6.

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The buildings at this College have recently been extended, and the course of instruction completely re-organised for the technical training of young men in Agriculture and Horticulture. The laboratories, workshops, gardens and farm are equipped in a manner which admits of a technical training unsurpassed at any other institution.

Hitherto there have been two sessions in the year, viz., a winter session from October to March, and a summer session from March to September; but, as the character of the education which it is now proposed to provide makes it necessary to extend the session to one year, the new session will last from October to September.

Students of agriculture will be required to take part in the work of the farmyard and of the fields. The horticultural students will be required to devote part of their time to the work of the gardens and orchards.

The next session will commence on 17th October, 1905, and will end on 7th September, 1906.

## ENTRANCE EXAMINATION.

The entrance examination, which candidates will attend at their own expense, will be held simultaneously in each of the Provinces, at centres which will be duly announced to each applicant for admission. No pupil will be admitted to the College who fails to pass this examination. The subjects included in the examination will be as follows:—

- (1.) *English*, including Dictation and Composition.
- (2.) *Arithmetic*, including calculations requiring a thorough knowledge of Weights and Measures, Decimal and Vulgar Fractions, Percentages, and Interest.
- (3.) *Mathematics*—Algebra to Simple Equations and the Elements of Mensuration.
- (4.) *Practical Agriculture or Horticulture*.

## FEES AND SCHOLARSHIPS.

NOTE.—*The following arrangements regarding Scholarships and Fees will be revised when the Department's system of local agricultural education is further developed.*

### *Fees.*

Hitherto the fees for Irish students have been—Summer session, £15; Winter session, £10.

The fee henceforth for the entire period will be £25 for Irish students whose parents or guardians derive their means of living mainly from farming.

It is to be noted that besides instruction this fee includes board, residence, laundry and medical attendance, and it is fixed at such a scale as practically to cover the cost of food only.

The fee for other students will be £60.

Fees must be paid to the Superintendent on entrance, and in addition a sum of £2 must be deposited at the same time to cover the cost of repairs to clothes, &c. The unexpended balance, if any, of this deposit will be refunded at the close of the session.

Students will be required to provide themselves with a proper outfit, particulars of which may be obtained by selected candidates from the Superintendent.

### *Scholarships.*

For the past four years the Department have given twenty-five free places, available for the summer session, the period for which the fee charged was £15. Instead of these free places twenty-five scholarships available for the extended session will now be offered.

The Scholarships will be awarded on the result of the entrance examination.

Application for admission must be made on the prescribed form, to be obtained from—

THE DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION STREET, DUBLIN.

Last date for receiving applications, 31st August, 1905.

July, 1905.

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## AGRICULTURAL STATION, CLONAKILTY, COUNTY CORK.

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SESSION 1905-6.

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The Department of Agriculture and Technical Instruction have acquired the farm of Darrara, situated about three miles from Clonakilty, consisting of about 340 acres of land, as a Station in connection with their Agricultural Schemes, at which experiments in the breeding and feeding of live stock, poultry, &c., in tillage and dairying, as well as tests of inventions in all branches of Agriculture, will be conducted. It is intended to admit to the Station a number of young men as apprentices, who will be required to take part, under the supervision of an experienced Agriculturist, in all the work of the farm, whether in connection

with seasonable operations or permanent improvements. In addition to the work in the fields, provision will be made for practical instruction in the farmyard, dairy, workshop and garden. In the class-room attention will be given, in the evenings and at other times when outdoor work is not pressing, to English, Arithmetic (including Surveying), Book-keeping and Technical Agriculture. This instruction will not have reference to any examinations, and will be of such a character as will continue the general education of the pupils and be useful to young men who intend to become farmers. Applicants must be not less than seventeen years of age on the date on which the session opens, and each must give an undertaking that it is his intention to become a farmer in Ireland. He must also provide, in his application form, evidence of a sure prospect of obtaining a farm of his own, or *bonâ fide* occupation on a farm. Preference will be given to applicants from the province of Munster. It will be an additional recommendation if the applicant produces a certificate from the Itinerant Instructor in Agriculture for the County in which he resides, that he has taken advantage of the Instructor's lectures and demonstrations, and has shown a desire to improve his knowledge of tillage farming.

The apprentices must reside in the buildings attached to the station, where they will be in the charge of a house master and matron.

The session will commence on the 17th October, 1905, and will terminate on 7th September, 1906.

#### *Fees.*

The scale of fees for apprentices whose parents or guardians derive their means of living mainly from farming will be proportional to the aggregate tenement valuation of their holdings, as under:—

Where the aggregate valuation does not exceed	Per Session
£20, . . . . .	£3
Exceeds £20 but does not exceed £30, . . . . .	£5
Exceeds £30 but does not exceed £75, . . . . .	£10
Exceeds £75, . . . . .	£15
For all other apprentices, . . . . .	£20

Apprentices will be notified of the fees payable by them. Fees must be paid to the Superintendent on entrance, and in addition a sum of £1 must be deposited at the same time to cover the cost of repairs to clothes, &c. The unexpended balance, if any, of this deposit, will be refunded at the close of the session.

Apprentices will be required to provide themselves with a proper outfit, particulars of which may be obtained by selected applicants from the Superintendent.

#### *Entrance Examination.*

An entrance examination will be held, particulars of which will be intimated at a later date. The subjects included in the examination are as follows:—

*English*—including Dictation, Grammar and Composition.

*Arithmetic*—including simple calculations showing a knowledge of weights and measures.

No person will be admitted as an apprentice whose general education is, in the opinion of the Department, too backward to enable him to profit by the class-room instruction.

Application for admission must be made on the prescribed form, to be obtained from—

THE DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET, DUBLIN.

Latest date for receiving applications, 31st August, 1905.

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## AGRICULTURAL STATION, BALLYHAISE, COUNTY CAVAN.

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SESSION 1905-6.

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The Department of Agriculture and Technical Instruction have acquired about 600 acres of land and premises at Ballyhaise, Co. Cavan, as a Station for the selection and distribution of different kinds of live stock, poultry, &c., in connection with their Agricultural Schemes, and for the carrying out of experiments in the breeding and feeding of live stock, in tillage and dairying, and for tests of inventions in all branches of agriculture. It is intended to admit to the Station a number of young men as apprentices, who will be required to take part, under the supervision of an experienced Agriculturist, in all the work of the farm, whether in connection with seasonable operations or permanent improvements. In addition to the work in the fields, provision will be made for practical instruction in the farmyard, dairy, workshop and garden. In the classroom attention will be given, in the evenings and at other times when outdoor work is not pressing, to English, Arithmetic (including Surveying), Book-keeping and Technical Agriculture. This instruction will not have reference to any examinations, and will be of such a character as will continue the general education of the pupils and be useful to young men who intend to become farmers. Applicants must be not less than seventeen years of age on the date on which the session opens, and each must give an undertaking that it is his intention to become a farmer in Ireland. He must also provide, in his application form, evidence of a sure prospect of obtaining a farm of his own, or *bonâ fide* occupation on a farm. Preference will be given to applicants from the province of Ulster. It will be an additional recommendation if the applicant produces a certificate from the Itinerant Instructor in Agriculture for the County in which he resides, that he has taken advantage of the Instructor's lectures and demonstrations, and has shown a desire to improve his knowledge of tillage farming.

The apprentices must reside in Ballyhaise House, attached to the station, where they will be in the charge of a house master and matron.

The session will commence on the 17th October, 1905 (or as soon thereafter as the alterations to Ballyhaise House have been completed), and will terminate on 7th September, 1906.

#### *Fees.*

The scale of fees for apprentices whose parents or guardians derive their means of living mainly from farming will be proportional to the aggregate tenement valuation of their holdings, as under:—

Where the aggregate valuation does not exceed	Per Session.
£20, . . . . .	£3
Exceeds £20 but does not exceed £30, . . . . .	£5
Exceeds £30 but does not exceed £75, . . . . .	£10
Exceeds £75, . . . . .	£15
For all other apprentices, . . . . .	£20

Apprentices will be notified of the fees payable by them. Fees must be paid to the Superintendent on entrance, and in addition a sum of £1 must be deposited at the same time to cover the cost of repairs to clothes, &c. The unexpended balance, if any, of this deposit, will be refunded at the close of the session.

Apprentices will be required to provide themselves with a proper outfit, particulars of which may be obtained by selected applicants from the Superintendent.

#### *Entrance Examination.*

An entrance examination will be held, particulars of which will be intimated at a later date. The subjects included in the examination are as follows:—

*English.*—including Dictation, Grammar and Composition.

*Arithmetic.*—including simple calculations showing a knowledge of weights and measures.

No person will be admitted as an apprentice whose general education is, in the opinion of the Department, too backward to enable him to profit by the class-room instruction.

Application for admission must be made on the prescribed form, to be obtained from—

THE DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET, DUBLIN.

Latest date for receiving applications, 31st August, 1905.

## AGRICULTURAL STATION, ATHENRY, COUNTY GALWAY.

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SESSION 1905-6.

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The Department of Agriculture and Technical Instruction have acquired lands and premises at Athenry, Co. Galway, as a Station in connection with their Agricultural schemes, for the selection and distribution of different kinds of live stock, poultry, &c., and for the carrying out of experiments in the breeding and feeding of live stock, in tillage, dairying, and for tests of inventions in all branches of Agriculture. It is intended to admit to the Station a number of young men as apprentices, who will be required to take part, under the supervision of an experienced Agriculturist, in all the work of the farm, whether in connection with seasonable operations or permanent improvements. In addition to the work in the fields, provision will be made for practical instruction in the farmyard, dairy, workshop and garden. In the classroom attention will be given, in the evenings and at other times when outdoor work is not pressing, to English, Arithmetic (including Surveying), Book-keeping and Technical Agriculture. This instruction will not have reference to any examinations, and will be of such a character as will continue the general education of the pupils and be useful to young men who intend to become farmers. Applicants must be not less than seventeen years of age on the date on which the session opens, and each must give an undertaking that it is his intention to become a farmer in Ireland. He must also provide, in his application form, evidence of a sure prospect of obtaining a farm of his own, or *bonâ fide* occupation on a farm. Preference will be given to applicants from the province of Connaught. It will be an additional recommendation if the applicant produces a certificate from the Itinerant Instructor in Agriculture for the County in which he resides, that he has taken advantage of the Instructor's lectures and demonstrations, and has shown a desire to improve his knowledge of tillage farming.

Owing to the absence of adequate accommodation only a limited number of apprentices can be admitted for the 1905-6 session. Until new premises have been provided no fees will be charged.

Apprentices will be required to provide themselves with a proper outfit, particulars of which may be obtained by selected applicants from the Superintendent.

A sum of £1 must be deposited with the Superintendent on entrance to cover the cost of repairs to clothes, &c. The unexpended balance, if any, of this deposit will be refunded at the close of the session.

The session will commence on the 17th October, 1905, and will terminate on the 7th September, 1906.

*Entrance Examination.*

An entrance examination will be held, particulars of which will be intimated at a later date. The subjects included in the examination are as follows:—

*English*—including Dictation, Grammar and Composition.

*Arithmetic*—including simple calculations showing a knowledge of weights and measures.

No person will be admitted as an apprentice whose general education is, in the opinion of the Department, too backward to enable him to profit by the class-room instruction.

Application for admission must be made on the prescribed form, to be obtained from—

THE DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET, DUBLIN.

Latest date for receiving applications, 31st August, 1905.

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II.—TECHNICAL INSTRUCTION.

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PROGRAMME OF EXPERIMENTAL SCIENCE, &c., FOR DAY  
SECONDARY SCHOOLS.

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EXPLANATORY CIRCULAR TO MANAGERS AND  
PRINCIPALS.

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DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET, DUBLIN,

June, 1905.

SIR OR MADAM,—In issuing the Revised Regulations for the teaching of Experimental Science, Drawing, Manual Instruction, and Domestic Economy in Day Secondary Schools for the session 1905-6, the Department have considered it advisable, having regard to

the stage of organisation of teaching which has now been reached, and to the representations of School Managers and Teachers, to issue in a single volume the complete conditions regarding regulations for grants, qualifications of teachers, syllabuses of the several subjects of instruction, and a list of forms relating to Day Secondary School work issued by the Department.

The grant administered under this Programme is a sum of money voted annually by Parliament for instruction in Science and Art, with the object of maintaining an efficient system of instruction in these subjects in Day Secondary Schools. The aid is given under the conditions set out in the detailed Regulations. Aid is also given towards the purchase of apparatus and equipment under the conditions set out on Form S 4.

The Regulations now issued are materially the same as those which were in force during the session 1904-5. The Department have, however, been enabled to make one important change in regard to the subject of Domestic Economy. Hitherto grants in respect of attendances at instruction in this subject could be obtained only when it was taken in conjunction with the two-year Preliminary Course, or one of the Special Courses of Experimental Science and Drawing of the Department's Programme. Under the revised Regulations Domestic Economy may now be adopted as one of the Special Courses for the third and fourth years (and be taken alone), whilst grants will still be paid in respect of instruction in this subject when it is included in the two-year Preliminary Course as auxiliary to Experimental Science and Drawing. In the case of those Schools which are not prepared to take up the Special Third and Fourth year Syllabuses in Domestic Economy, and to devote to them the minimum of three hours per week throughout the session, grants will be payable in respect of instruction, given for at least an hour and-a-half per week, in the Third and Fourth Year Auxiliary Syllabuses taken in conjunction with one or more of the Special Courses in Experimental Science and Drawing.

It is hoped that this important change will enable the Managers of Girls' Schools to give Domestic Economy its rightful place in the School curriculum, in view of the intrinsic value of the subject educationally, and also on account of the new generally realised need for teaching of this kind. Efficient and practical instruction in the subject of Domestic Economy is now acknowledged to be an essential part of a girl's education, and the Department desire that it should occupy its due position in Irish Secondary Schools. Domestic Economy, in the view of the Department, embraces practical and scientific training in the whole range of the domestic arts; comprising amongst other things, instruction in Elementary Physiology and Hygiene, needlework, sanitation, and the keeping of household accounts, as well as the cultivation of thrift and resourcefulness, and the formation of habits of observation.

The syllabuses of the Special Course in Domestic Economy have been rearranged, and new syllabuses drafted for the auxiliary course; your special attention is directed to these new syllabuses.



The question of the qualification of teachers for Domestic Economy has been carefully considered, and a revised scheme drafted, of which particulars will be found in Circular 25. The Department hope to be able to afford increased facilities for the training and qualification of teachers in this subject by means of Summer Courses in 1905 and following years.

To pupils who follow out a complete four years' course, taking the Special Course in Domestic Economy in the third and fourth years, a certificate will be awarded under the same conditions as for the Secondary School Certificate (Science or Drawing).

The Prefatory Note respecting the teaching of Science, Drawing, Manual Instruction, and Domestic Economy in Day Secondary Schools has been re-written and is printed with the Syllabuses. The efficiency of teachers depends so largely upon their knowledge and experience of teaching methods in addition to actual knowledge of the subject taught, that it is hoped they will give this Prefatory Note their most careful attention, and form exact and definite ideas of the aims and objects of their teaching and of the methods by which they may be attained.

The Syllabus of the Special Course in Chemistry has been revised in the light of the experience gained in the last two years.

The efficiency of the instruction will, as heretofore, be tested by inspection, as a rule, without notice. During the latter part of the School session, however, notice will be given of a visit of Special Inspection for that session. At all visits it shall be within the discretion of the Inspector to test any or all of the classes by practical exercises in the laboratory, or by *viva-voce* examination of classes, or of individuals, or by written examinations, or by a combination of these methods. It should be observed that the rates of payment may be increased by one-tenth or reduced by one or more tenths, as the Department, on receipt of the Inspector's report, may determine. Reduction by more tenths than one will be exceptional. In cases in which such exceptional treatment is necessary, the Department will, in all probability adopt the alternative of giving a reasonable warning, and unless marked improvement follows, will remove such a school from the list of those aided by the system of grants.

The qualifications required of teachers are set out in Circulars 23, 16, 24 and 25. The Department reserve the right to withdraw recognition of a teacher's qualifications should circumstances occur to render such a course desirable.

The Summer Courses for Teachers will be continued as heretofore, but it is hoped that they will, after 1908, develop into "Post Graduate" Courses on special subjects for those already qualified, and that more regular and less exceptional means for the training of teachers will have had time to operate.

As you are already aware, the Intermediate Education Board have adopted the Department's Syllabuses in Experimental Science, Drawing, and Domestic Economy. The details of the arrangement by which schools and pupils may obtain recognition under the regulations of the Intermediate Education Board for proficiency in Experimental Science, Drawing, and Domestic Economy, are published in the Rules of that Board.

As there appears to have been some difficulty in appreciating the conditions required for a Pass under the regulations of the Intermediate Education Board, these conditions are separately stated on page 14 of these Regulations.

I am, Sir or Madam,

Your obedient Servant,

T. P. GILL,

*Secretary.*

## REGULATIONS FOR THE ADMINISTRATION AND DISTRIBUTION OF GRANTS FOR EXPERIMENTAL SCIENCE, DRAWING, MANUAL INSTRUCTION, AND DOMESTIC ECONOMY IN DAY SECONDARY SCHOOLS IN IRELAND.

*(Revised to June, 1905. Alterations are printed in italics).*

### I.—SUBJECTS.

1. EXPERIMENTAL SCIENCE shall mean such a system of instruction in Physical and Natural Science as will involve the greater part of the work being done by the pupils themselves in an approved laboratory.

2. DRAWING shall mean a system of instruction in Freehand, Object, Model, and Geometrical Drawing, and Modelling.

3. MANUAL INSTRUCTION shall include instruction in the use of tools employed in Wood or Metal-working, and drawing in connection therewith.

4. DOMESTIC ECONOMY shall include Cookery and *Home-sewing*, and may include Laundry work or any other form of practical instruction in household management of which the Department may approve.

5. No scheme will be approved unless the Department are satisfied that due provision is made for the instruction of the pupils in the other main branches of a general education.

### II.—GRANTS.

Grants in respect of courses of instruction in Experimental Science, Drawing, Manual Instruction, and Domestic Economy, may be made, in accordance with the following regulations, to Day Secondary Schools in which sufficient provision is made for instruction in the other main branches of a general education:—

1. Grants shall be payable in respect of attendances made by those students only who are twelve years of age on or before the 31st day of May in the calendar year in which the course is entered upon, and who have completed an education which would entitle them to be placed in the Sixth Class of a

school under the Board of National Education in Ireland. Pupils on the roll of a National School are not eligible for attendance grants.

2. Grants shall be payable in respect of attendances made by pupils of those schools only which have been approved by the Department.

3. Grants on the average attendance of duly qualified pupils will be made for each hour of instruction per week throughout the school year, according to the following scale:—

EXPERIMENTAL SCIENCE.—10*s.* for the first year of the course; 12*s.* 6*d.* for the second year of the course; 15*s.* for the third year of the course; and 20*s.* for the fourth year of the course.

DOMESTIC ECONOMY (*as a Special Course*).—8*s.* for the third or fourth years of the course.

DRAWING.—5*s.* for the first year of the course; 6*s.* for the second year of the course; 7*s.* for the third or fourth years of the course.

MANUAL INSTRUCTION AND DOMESTIC ECONOMY (*Auxiliary Courses*).—6*s.* for the first year of the course; 7*s.* for the second year of the course; 8*s.* for the third or fourth years of the course.

4. The numbers on which grants for each subject are to be calculated, at the foregoing rates, shall be determined by adding together the total number of hours of attendance made by all the pupils in that subject (at the approved time-table hours), and dividing by forty, the normal school year being regarded as of forty weeks.

5. The syllabuses of instruction "first year" and "second year" of the Preliminary, and "third year" and "fourth year" of the Special Courses correspond with the "first year," "second year," &c., rates of payment; but the claims paid on behalf of any pupil's attendance will, in the first instance, be at first year rates; in the second instance, at the second year rates; and so on.

6. Grants will not be payable in respect of the attendances of any one pupil for more than four years in all—once in each year of the Preliminary; and once in each year of a Special course; but it is not obligatory that the separate claims should be made in consecutive academic years.

### III.—CONDITIONS OF GRANTS.

1. The courses of instruction should begin in August or September of any year, and must be continuous throughout the school year. The hours per week devoted to the course must be fairly distributed throughout the week. In exceptional circumstances, where previous application has been made, the Department may sanction another arrangement. Deviations from the approved time-table, unless previously sanctioned, will be regarded as a serious irregularity.

2. Claims for attendance grants may be preferred on behalf of those students only who have punctually and regularly attended instruction in all the obligatory subjects of the Preliminary, or of a Special, course.

3. Claims for attendance grants may be preferred on behalf of those students only who have been registered as in attendance at instruction in each of the prescribed subjects on or before the 1st day of November in any academic year.

4. Grants will not be payable in respect of the attendances of pupils of any school which, after working for one academic year in accordance with the Department's regulations, has not the two years' Preliminary Course in operation.

5. Grants will not be payable in respect of attendances at Manual Instruction or Domestic Economy (*Auxiliary Courses*) in any year, except in the case of pupils *who have attended instruction in the Preliminary Course of Experimental Science and Drawing or in one of the subjects of a Special Course, in that year, in accordance with the Regulations.*

6. Grants will not be payable in respect of the attendances of a pupil at instruction in a subject of the fourth year, which was not the subject in respect of which a claim was made on behalf of the same pupil in the third year; except in the case of Geology.

7. Grants will be made only upon a satisfactory report by an Inspector of the Department. The Inspector will satisfy himself not only that the attendances on which the claim is based have actually been made, but also that the instruction is of a class superior to that given in Elementary Schools.

8. The grant to be made in respect of any subject of any year in accordance with the foregoing regulations, may, in exceptional cases, be increased by one-tenth when the Inspector of the Department is of opinion that the work is of conspicuous merit. It may also be reduced by one or more tenths for defects of equipment, or of organisation, *or of instruction*, or for any other cause which may tend to lessen the efficiency of the work done.

#### IV.—REGISTRATION.

Attendance registers will be supplied by the Department upon receipt of the form of application for recognition of the classes (Form S. 44); attendances not registered in the manner indicated on the official registers, or registered before the receipt of Form S. 44, will be disregarded. A class may not be said to have begun until attendances are so registered.

#### V.—COURSES OF INSTRUCTION.

##### 1. The Courses of Instruction include—

(a.) A PRELIMINARY (TWO YEAR) COURSE, which is obligatory on all pupils and on all schools claiming grants under these regulations, and

(b.) SPECIAL COURSES, which are optional.

2. THE PRELIMINARY (TWO YEAR) COURSE may vary according to the character of the school; but it shall include Experimental

Science and Drawing; and not less than three hours per week shall be devoted to Experimental Science, and not less than one hour per week to Drawing.

In schools claiming grants for more than six hours' instruction in the *Preliminary Course* in any week, Manual Instruction or Domestic Economy must form part of the *Preliminary Course*; and, in such cases, at least one and a-half hour's instruction per week must be devoted to one of those subjects.\*

In schools also which do not provide instruction in one of the Special courses, or whose Special Course has not been recognised by the Department for attendance grants, Manual Instruction or Domestic Economy, with Experimental Science and Drawing, shall constitute the *Preliminary Course*; and in order that the *Preliminary Course* in such schools may be recognised, the time-table must show that at least six hours' instruction per week is devoted to those three subjects.

3. A SPECIAL COURSE must include one, but may not include more than three, of the undermentioned subjects, to which Manual Instruction or Domestic Economy (*unless taken as a Special Course*) may be added. Managers will be allowed much latitude in selecting the subject or subjects most suitable to their own schools.

Managers desiring to have the special courses of their schools recognised will be required to show that a fair proportion of the pupils who have worked through the *Preliminary Course* are prepared to attend the Special Course; that not less than three hours per week are to be devoted to each subject of the Special Course; and that at least one-third of the time is to be assigned to theoretical instruction.

Not more than six hours per week may be considered when computing the total number of hours of attendance at a subject included in a Special Course.\*

4. The subjects of the *Preliminary* and *Special Courses* shall be followed in the order prescribed in the Department's published Syllabuses, and pupils may not be admitted to any course, who have not worked satisfactorily through the preceding, or equivalent, courses.

5. The subjects of the Special Courses are:—

- (1.) Physics: Third year—Heat, Light, and Sound; fourth year—Magnetism and Electricity.
- (2.) Chemistry Third year—Inorganic Chemistry; fourth year—Inorganic Chemistry, with some Elementary Organic Chemistry.
- (3.) Mechanical Science: Third year syllabus; fourth year syllabus.
- (4.) Natural Science:—
  - (a.) Botany: Third year syllabus; fourth year syllabus.
  - (b.) Physiology and Hygiene: Third year syllabus; fourth year syllabus.
  - (c.) Geology: A fourth year subject.

Each of these divisions of Natural Science will count as one subject in the manner indicated.

\* Attendances at Special Inspections may be claimed on, in addition to the hours set apart in the general time-table.

- (5.) *Domestic Economy (Special Course): Third year syllabus, fourth year syllabus.*
- (6.) *Drawing: Third year syllabus; fourth year syllabus.*

#### VI.—LABORATORIES.

No grant will be made for instruction unless due provision is made for experimental work in Science, on the part of the pupils, in properly equipped and approved laboratories.

#### VII.—DURATION OF LESSONS.

1. Practical Instruction in Science, Manual Instruction or Domestic Economy, must be given in lessons of at least eighty minutes' duration.

2. Lessons of less than forty minutes' duration will not be considered in computing the "total number of hours of attendance."

3. The minimum time per week recognised for grants on behalf of attendances at Manual Instruction or Domestic Economy is one hour and a-half.

4. The time-table of the school must be so arranged as to leave sufficient time to the teacher for preparation of laboratory work.

#### VIII.—SIZE OF CLASSES.

1. Not more than forty pupils shall be taken at a time by one teacher for Theoretical Instruction, nor more than twenty for Practical Instruction in any subject, unless an assistant, recognised by the Department, is provided. In that case the number for Practical Instruction may be increased to thirty. Instruction in Drawing may, for this purpose, be regarded as theoretical instruction.

2. Where classes for practical instruction are small, concurrent instruction in two subjects may be exceptionally allowed, but the approval of the Department must be obtained in each case.

3. Concurrent instruction in the first and second year syllabuses of the Preliminary Course in Drawing will be allowed under one teacher where the number of pupils under instruction does not exceed thirty.

#### IX.—GENERAL CONDITIONS.

1. The qualifications of the teachers and assistant teachers, and the time-table of the school must be approved by the Department.

2. It shall be a condition of grants being made, that, except in the case of teachers who give their services gratuitously, a fixed salary shall be paid to the teachers of the classes, either in respect of these classes or of their work in the school as a whole; that a reasonable sum of money shall be provided for the upkeep of the premises; and that the grants obtained shall be paid into the school account and be used for improving the efficiency of the school.

3. That portion of the income of a school which is derived from grants in accordance with these regulations must be applied to such purposes as shall be approved by the Department. If at any time it appears that the application of the income is unsatisfactory, the assistance of the Department may be withdrawn. An account of the receipts and expenditure of each school in respect of these grants must be furnished to the Department annually, on a form to be had from the Secretary.

4. The Department reserve the right to withhold grants under these regulations from any school conducted for private profit in which the fees are, in the Department's opinion, excessive, or which is situated in a locality already sufficiently supplied with public institutions.

5. The decision of the Department in all questions arising in connection with the payment of grants, under this programme must be final.

*Circular 25\**

DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION STREET, DUBLIN,  
*May, 1905.*

### QUALIFICATIONS OF TEACHERS OF DOMESTIC ECONOMY IN DAY SECONDARY SCHOOLS.

SIR, OR MADAM,—The Department have made arrangements by which, it is hoped, the teaching of Domestic Economy in Day Secondary Schools for Girls may be extended and improved. Hitherto grants in respect of attendances at instruction in this subject could be obtained only when it was taken in conjunction with the two-year Preliminary Course, or one of the Special Courses, of Experimental Science and Drawing of the Department's Programme. Grants will still be paid according to the Regulations hitherto in force; but, during the third and fourth years, Domestic Economy may be taken alone as one of the Special Courses.

In view of these arrangements it has been deemed advisable to reconsider the question of the qualifications of teachers, and to provide specially for the case of Day Secondary Schools by offering facilities to persons desirous of being recognised as Teachers of Domestic Economy in such schools.

Those persons will be recognised as fully qualified teachers of Domestic Economy who have obtained the Diploma of the Irish Training School of Domestic Economy, or who hold the Cookery Teachers' Full Diploma issued by the Board of Education, London, together with full certificates in Laundrywork and Dressmaking

\* An incorrect copy of this circular letter was printed at page 560, No. 2, Vol. V. of the *Journal*.

from an approved Training School of Domestic Economy. A list of the Training Schools recognised for the purpose of this qualification is printed as an appendix to this circular letter.

Persons who do not hold the Diplomas or Certificates specified, but who are otherwise able to satisfy the Department that they are sufficiently qualified, may receive exceptional recognition; but exceptional recognition will not be granted to applicants who cannot submit satisfactory evidence of having received such a course of training as would fit them to give instruction in Domestic Economy.

#### SPECIAL PROVISIONS FOR RECOGNITION OF TEACHERS OF DOMESTIC ECONOMY IN DAY SECONDARY SCHOOLS.

With a view to affording opportunities to persons desirous of being recognised as Teachers of Domestic Economy in Day Secondary Schools, but who have been unable to obtain the Diploma and Certificates above mentioned, the Department will be prepared to grant provisional recognition in this subject to those who have—

- (1.) successfully attended special Summer or other recognised teaching courses of instruction in the subjects of the two-year Preliminary Course of Experimental Science; and
- (2.) successfully attended a Summer Course in Domestic Economy consisting of not less than 100 hours' instruction.

Provisional recognition so obtained may be converted into permanent recognition in the case of persons who, having complied with conditions (1) and (2) above, attend successfully two further Summer Courses in Domestic Economy, provided that they shall also have given instruction in Domestic Economy for two complete school sessions to the satisfaction of the Department's Inspectors. Such persons will receive the Irish Secondary Teachers' Science Certificate, entitling them to give instruction in Domestic Economy and in the two-year Preliminary Course of Experimental Science in accordance with the Department's Regulations for Day Secondary Schools. This certificate, however, will not be accepted as evidence of qualification to give instruction in Technical Schools and Classes.

Should any teacher recognised in accordance with the foregoing conditions discontinue, from any cause, the teaching of Domestic Economy under the Department's Regulations throughout a period of five years, the recognition granted will lapse.

I am, Sir, or Madam,

Your obedient Servant,

T. P. GILL,

*Secretary.*



## APPENDIX.

## LIST OF TRAINING SCHOOLS OF DOMESTIC ECONOMY, THE CERTIFICATES OF WHICH ARE RECOGNISED BY THE DEPARTMENT.

Edinburgh: School of Cookery, &c., Ltd., 3, Atholl Crescent, Edinburgh.

Glasgow: Training School of Cookery, &c., 86, Bath Street, Glasgow.

Glasgow: West End Training School of Cookery, &c., 2, Dalhousie Street, Glasgow.

Liverpool: Training School of Cookery, Colquitt Street, Liverpool.

London: Battersea Polytechnic Training School of Domestic Economy, Battersea, London, S.W.

London: National Society's Training School of Cookery, Lambeth, London, S.E.

London: National Training School of Cookery, Buckingham Palace Road, London, S.W.

Newcastle-on-Tyne: Northern Counties Training School of Cookery, New Bridge Street, Newcastle-upon-Tyne.

All communications respecting these Schools must be addressed to the Secretaries.

*Circular 36.*

DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION STREET, DUBLIN,  
*April, 1905.*

SIR,—I have to acquaint you, for the information of the Council of \_\_\_\_\_ that the Department are advised that the present Committees of Agriculture and Technical Instruction, appointed under Section 14 (1) of the Agriculture and Technical Instruction (Ireland) Act, 1899, being Committees appointed by the County Council, are not legally entitled to administer the funds available for the purposes of Technical Instruction in Urban Districts, and that the Councils of Urban Districts are not legally entitled to delegate to a Committee of a County Council their rights and responsibilities in regard to Technical Instruction, even though members of the Urban District Councils act on such a Committee either as members of the County Council or as co-opted members.

In the opinion of the Department it would, in many instances, be detrimental to the interests of Technical Instruction to formulate separate schemes for the County and for the Urban Districts, and in order to provide for the economical and efficient administration of the Technical Instruction funds for the area controlled by the present Committee for County \_\_\_\_\_ the Department would suggest the appointment, under Section 14 (2) of the Act, of a Joint Committee to administer Schemes of Technical Instruction in non-agricultural subjects, with a bank account distinct from that for the County

**Agricultural Schemes.** This Committee, which should be designated the "Joint Technical Instruction Committee for County \_\_\_\_\_," would consist of representatives of the County Council and of the Urban District Councils, the number of representatives of each contributing authority being proportional to the total funds which would be available for an independent scheme under each authority. The "total funds available" is here understood to mean the joint fund formed by the local contribution from rates, and the contribution from the Department's endowment.

The representatives would in each case include Councillors, but might also include persons who, not being Councillors, have special knowledge of educational questions. These latter persons would be called added members, and would in all cases be nominated by the contributing Councils. The majority of the total representatives should be Councillors.

The Department are advised that a Joint Committee, constituted as suggested above, would be a Statutory Committee within the meaning of the Agricultural and Technical Instruction (Ireland) Act of 1899, but that, owing to its joint character, its tenure of office would determine on each occasion with that of any of the local authorities who are represented upon it. The Joint Committee must, accordingly, be re-appointed after the re-election of any of the Urban District Councils in January of any year, and after the re-election of the County Council in June of every third year.

The Department are of opinion that a Committee so constituted may be entrusted with any powers exercisable by the local authorities in respect of Technical Instruction, except the power of raising a rate or of borrowing money.

With a view to facilitating the appointment of the Joint Committee, a memorandum containing suggestions as to its constitution, drawn up by the Department, is enclosed herewith.

It is not proposed that the Joint Committee to be elected should undertake the administration of the present scheme, which determines on the 31st July, but that the present Committee should continue to administer the Scheme in addition to the Agricultural Schemes. In order, however, that all arrangements may be completed at an early date for putting the scheme for the forthcoming session into operation upon the 1st August, I have to express the hope that the contributing authorities will proceed immediately to the appointment of a Joint Committee, and not postpone consideration of the matter until after the County Council elections in June next.

The Agricultural Schemes in the County will, of course, continue to be administered by a Committee (such as the present Committee) appointed by the County Council under Section 14 (1) of the Act of 1899.

An acknowledgement of the receipt of this communication is requested.

I am, Sir,

Your obedient Servant,

T. P. GILL,  
*Secretary.*

*Circular 37.*

DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION STREET, DUBLIN,  
*April, 1905.*

SIR,—I have to enclose herewith, for the information of your Committee, copy of a communication which has been addressed to the local authorities within the geographical area of County \_\_\_\_\_ contributing to the scheme of Technical Instruction administered by your Committee.

It will be observed that it is not proposed to alter the arrangements for the administration of the scheme for the present academic year, but that, should the local authorities concerned decide to adopt a joint scheme for the forthcoming session, it will be necessary that a separate committee for Technical Instruction should be appointed, in accordance with the provisions of Section 14 (2) of the Agriculture and Technical Instruction (Ireland) Act, 1899.

An acknowledgement of the receipt of this communication is requested.

I am, Sir,

Your obedient Servant,

T. P. GILL,  
*Secretary.*

*Circular 38.*

DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION STREET, DUBLIN,  
*June, 1905.*

SIR, OR MADAM,—With reference to the grants which have hitherto been payable by the Department in aid of the purchase of fittings, apparatus, examples, &c., required for use in connection with Science and Art Classes and with Classes in Experimental Science, Drawing and Manual Work conducted under the conditions of the Department's Regulations for Day Secondary Schools, I have to inform you that it has not been found possible to arrange for the continuation of these grants beyond the current financial year, ending the 31st March next.

The amount which may be expended by the Department in this connection during the year is, moreover, strictly limited, and they will, accordingly, be unable to consider claims received after the full sum available has been promised to the Managers of Schools.

The allocation of funds in aid of the provision of equipment will be continued as heretofore until such time as the promises will have exhausted the funds at the Department's disposal for this purpose, but in no circumstances will applications upon Form S. 4 be accepted in these Offices if received after the 1st September next.

The Department further desire to direct attention to the fact that all grants allocated by them in respect of the purchase of fittings, apparatus, examples, &c., must necessarily be paid before the conclusion of the financial year, and, in order that time may be given for the adjustment of all matters in connection with grants due to Managers, the Department have fixed the 1st December next as the latest date upon which claims, on Form S. 6, for payment of the amounts promised, may be forwarded to these Offices.

I am, Sir, or Madam,

Your obedient Servant,

T. P. GILL,

*Secretary.*

### LECTURES ON THE AIMS AND METHODS OF TEACHING DRAWING AND EXHIBITION OF DRAWINGS AND ART WORK.

The Department have arranged for a series of six lectures on the Aims and Methods of teaching Drawing, to be delivered by Mr. Henry Cadness, of the School of Art, Manchester, in the Lecture Theatre, Leinster House, Kildare-street, Dublin (by kind permission of the Royal Dublin Society). The dates and the subjects of these lectures are given below.

An Exhibition of Drawings and Art Work, representative of the work done in Irish Day Secondary Schools, Schools of Art, and Art Classes, will be on view at the Leinster Lecture Hall, Molesworth-street, Dublin, from Thursday, the 20th July, to Wednesday, the 26th July, between the hours of 11 a.m. and 7 p.m.

It is hoped that all persons interested in the teaching of this important subject will attend the lectures and visit the Exhibition.

Tickets of admission to the lectures may be obtained by teachers of Drawing and others interested in School work, on application, in writing, to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Dublin.

Admission to the Exhibition will be free.

#### LIST OF LECTURES.

Date of Lecture.	Hour.	Subject.
Monday, 17th July, ...	8 p.m.	Outline and other representations.
Friday, 21st July, ...	8 p.m.	Diagrams, copies, and examples.
Saturday, 22nd July, ..	12 noon.	Blackboard illustrations and demonstrations. Development of the subject of a lesson.
Monday, 24th July, ...	8 p.m.	Geometrical models used as bases of nature forms.
Saturday, 29th July, ...	12 noon.	Constructive Drawing.
Monday, 31st July, ...	8 p.m.	Brush and other exercises.

### III.—VETERINARY.

No. 3747/05 V.B.

#### EPIZOOTIC LYMPHANGITIS.

The Department of Agriculture and Technical Instruction for Ireland desire to state that the contagious disease among horses known as Epizootic Lymphangitis, which, when it first appeared in Ireland in the autumn of the year 1903, was confined to military horses, has, during the last few months, been found among horses belonging to civilians in the Counties of Kilkenny and Waterford.

Special measures have been adopted for the prevention of the spread of the disease; and, with a view to its final eradication, the Department cannot too strongly impress on all persons who either possess horses suspected to be suffering from Epizootic Lymphangitis or who may become aware of any suspected case of the disease the urgent necessity for bringing every such case under the immediate notice of the Local Authorities under the Diseases of Animals Acts and of the Police, in order that the requisite action may be taken with the least possible delay.

Epizootic Lymphangitis is a contagious disease, presenting symptoms characterised by an eruptive condition of the lymphatics of the skin of the legs, head, neck, or other parts of the body where lymphatic vessels lie near the surface, and are consequently liable to be exposed to abrasions or more serious injuries.

In most cases it is first observed that small nodules or swellings have formed, varying in size from a pea to a walnut. These swellings eventually burst, become ulcers, and discharge a thick yellowish material (commonly called "matter") containing the micro-organism—the cryptococcus—which is the cause of the disease. The ulcers usually are near the site of a previous wound, the place at which probably the animal first became inoculated with the infection. Such previous wound may have been a saddle or other harness sore, or the result of a kick or bruise received while hunting, jumping, or in other ways. The ulcers do not heal readily; their edges become hard, raised, and in the centre red granulations (generally called "proud flesh") appear. When the "matter" dries, thick, dirty yellowish scabs are formed.

In most cases there is a discharge from one or both of the nostrils. Ulcers may appear on the mucous membrane of the nose, and the glands under the jaw may increase in size.

The micro-organism is easily transferred from a wound on a diseased horse to one on a healthy horse by the agency of sponges, rubbers, brushes, and other stable utensils, or even by the hands of the attendant.

In every instance where it is suspected that a horse is affected with this disease, the animal should be isolated at once. All stable utensils of every kind which have been used about the animal

should be put aside for its exclusive use. The person who attends such suspected case should not be employed in any way about other horses, and should not visit stables in which they are kept.

Owners of horses will do well to exercise a watchful care over their horses, and, if any symptoms resembling those above indicated appear, they should give prompt notice of the supposed existence of the disease to the Police of the district in which the animal is located.

The Department will be glad to have the earliest possible information that can be afforded of any suspected cases of the disease.

Further copies of this Memorandum can be had on application.

T. P. GILL, *Secretary*.

Department of Agriculture  
and Technical Instruction for Ireland,  
Upper Merrion-street, Dublin, July, 1905.

#### IV.—TRANSIT AND MARKETS.

#### CIRCULAR TO CREAMERY MANAGERS.

No. 5249/05.

DEPARTMENT OF AGRICULTURE AND  
TECHNICAL INSTRUCTION FOR IRELAND,  
UPPER MERRION-STREET, DUBLIN,  
*June, 1905.*

#### TRANSIT AND MARKETING OF IRISH BUTTER.

SIR,—I have to acquaint you, for the information of the proprietors of your Creamery, that during the year 1904 the Department caused inquiries to be made with a view to ascertain the measures that might be adopted for the purpose of improving the position of Irish butter in the markets of Great Britain. During the course of the inquiry the Department's Inspectors visited as many as 73 centres in Great Britain, and interviewed at least 400 merchants engaged in these centres in the butter trade. These merchants, while admitting that a decided improvement had been effected in the condition in which the consignments of butter reached the markets, considered that much remained to be done if Irish butter was to compete successfully in Great Britain with butters of foreign origin. The vast majority of the merchants interviewed dealt not only in Irish butter, but also in foreign butters, and were consequently in a position to give, from actual experience, useful information as to the defects in the methods of marketing butter produced in this country.

An almost general opinion seemed to prevail that Irish creamery butter contained an excessive proportion of moisture, and that it compared unfavourably in this respect with foreign butters. It may, however, be the case that sufficient ground does not exist for this view, and that the apparent excess of moisture is due to careless or imperfect handling of the butter on the worker. As is well known, butter containing a comparatively low percentage of water may "weep" if not properly worked, and such a condition of the butter conveys the impression that the proportion of water in the article is high.

Again, in many instances, it was represented that Irish creamery butter did not possess good keeping qualities. The absence of good keeping qualities necessitates the sale of the butter soon after reaching the market; but as it is not at all times practicable to dispose of heavy consignments in a few days, the belief that the butter will not retain its flavour causes the traders to place the article on the markets in large quantities when sale must be effected at a reduced price. Poor keeping qualities in the case of Irish butter—particularly summer butter—can only be accounted for on the grounds of (1) uncleanness in the dairy, and (2) an unclean milk supply. Both these causes can easily be removed if proprietors will devote more attention to the construction and management of the creamery, and rigidly reject all milk which is tainted, or which shows signs of careless or dirty milking.

The practice of holding Irish butter over in the hope of obtaining an increased price has greatly damaged the reputation of the butter, owing to the deterioration which it suffers in the often very imperfect condition of the stores provided for it.

In some cases it was mentioned that the quality of butter varied from week to week, and this variation was regarded as one of the factors operating against the success of the trade in Irish creamery butter. It was also stated by several British merchants that in a number of instances they found that they could not rely on obtaining, even in summer, a regular supply of Irish butter for their customers.

The circumstance that very little winter dairying is carried on in Ireland places the Irish producer at a disadvantage as compared with his Danish competitors, who are in a position to supply butter in fairly large quantities all the year round. The absence of a regular supply of Irish butter causes the article not to realise its true value during the early summer months in each year, when efforts are being made to regain the trade lost in winter. No insuperable difficulties would seem to lie in the way of the extension of winter dairying in Ireland. Each person who sends milk to a creamery should endeavour to supply his share of the milk required throughout the year to enable the creamery to maintain such an output as would retain its constant customers, and in view of the important issues involved, creamery proprietors would do well to take steps to secure the co-operation of their milk suppliers in developing this form of dairying.

The kiols generally used for the conveyance of 112 lbs. of butter are mentioned as being somewhat too light, the weight being ap-

parently seldom or never more than 13 lb. The despatch of butter in such kiels increases the chances of damage in transit, and consignors would be well advised in providing themselves with the standard cases (made of the best white beechwood, and weighing not less than 14 lbs.) as recommended in the Department's circular of March, 1904,\* to Consignors of Butter in Ireland. In many instances it appeared that the wood in the lids of the boxes was much lighter than that used in the other parts of the boxes, that the lids often projected over the sides and that the parts of the boxes were not securely fastened together. These defects have often been the cause of injury to the consignments.

Unseasoned wood was reported to be used in the construction of many of the boxes. The use of such wood is apt to taint the produce, and consignors should adopt all reasonable measures to secure that the wood in the boxes or kiels in which butter is despatched by them has been sufficiently seasoned. Only the best quality of parchment paper should be employed in wrapping the butter, in order to minimise the risk of the article becoming tainted.

The position of Irish creamery butter in the markets of Great Britain is admittedly not quite satisfactory, and in view of the importance of the butter trade to this country, and the severe competition with which the producer of Irish creamery butter has to contend, the Department would urge proprietors of creameries to adopt all practicable measures to have their butter placed on the markets in a more saleable condition. The butter should be carefully worked, so that it may not present the appearance of containing more water than is actually in it; more attention should be paid to the construction and cleanliness of the creamery; all milk suspected of being unclean should be rejected; every effort should be made to secure uniformity of quality; the butter should be despatched at regular intervals to the markets; action should be taken with the object of making a supply of butter available during the entire year; and the preparation of the consignments for transit should be in accordance with the recommendations contained in the Department's circular.

The Department would ask the proprietors of creameries to give careful attention to these suggestions, the adoption of which should go far towards securing and maintaining for Irish butter the premier place in the British markets.

I am, Sir,

Your obedient Servant,

T. P. GILL,

*Secretary.*



## NOTES AND MEMORANDA.

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The Board of Technical Instruction met on Tuesday, 9th May, at 2.30 o'clock, at the Offices of the Department, Upper Merrion-street, Dublin.

Present:—The Right Hon. Sir Horace Plunkett, P.C., K.C.V.O., F.R.S., Vice-President of the Department, in

**Meetings of the** the chair; Most Rev. John Clancy, D.D.,  
**Boards, &c.** Lord Bishop of Elphin; Mr. Patrick Dowd; Mr. Christopher J. Dunne, J.P.;

Sir Edward FitzGerald, Bart.; Sir James Henderson, A.M., D.L.; The Right Hon. Sir Otto Jaffé, J.P., Lord Mayor of Belfast; Very Rev. P. J. Lally, P.P.; Mr. William R. J. Molloy, J.P., M.R.I.A.; Mr. Thomas Power; Mr. William Smith, J.P.; Mr. Alexander Taylor; Mr. William J. Woodhams; Mr. T. P. Gill, Secretary of the Department; Mr. George Fletcher, Assistant Secretary in respect of Technical Instruction; Mr. R. Cantrell, Chief Clerk; Mr. W. G. S. Adams, Superintendent of the Statistics and Intelligence Branch; and Mr. J. P. Walsh, Clerk in Charge of Accounts.

Mr. J. D. Daly acted as Secretary to the meeting.

The Agricultural Board met on Wednesday, 10th May, at 11 o'clock, at the Offices of the Department, Upper Merrion-street, Dublin.

Present:—The Right Hon. Sir Horace Plunkett, P.C., K.C.V.O., F.R.S., Vice-President of the Department, in the chair; Mr. Alexander L. Clark, J.P.; Mr. R. Downes, J.P.; Colonel N. T. Everard, D.L., Mr. Patrick J. Hogan, J.P.; Most Rev. Denis Kelly, D.D., Lord Bishop of Ross; Mr. A. S. Lough, J.P.; Mr. T. P. Gill, Secretary of the Department; Professor J. R. Campbell, Assistant Secretary in respect of Agriculture; Mr. R. Cantrell, Chief Clerk; Mr. W. G. S. Adams, Superintendent of the Statistics and Intelligence Branch; and Mr. J. P. Walsh, Clerk in Charge of Accounts.

Mr. J. D. Daly acted as Secretary to the meeting.

The Consultative Committee for Co-ordinating Educational Administration met on Monday, 19th June, 1905, at the offices of the Department, Upper Merrion-street, Dublin. There were present:

**The Right Hon. Sir Horace Plunkett, P.C., K.C.V.O., F.R.S.,** Vice-President of the Department, in the chair; **Rev. T. A. Finlay, S.J., F.R.U.I.** (Intermediate Education Board); **Mr. W. R. J. Molloy, M.B.I.A.** (Board of Technical Instruction); **Mr. W. J. M. Starkie, Litt.D.** (National Education Board); **Mr. T. P. Gill** (Agricultural Board); **Mr. George Fletcher** (Assistant Secretary in respect of Technical Instruction); and **Mr. J. D. Daly, M.A.**, who acted as Secretary to the meeting.

The Committee had under consideration arrangements regarding the co-ordination of the National Education Board's Programme for evening schools with the Department's Regulations for the administration of Science and Arts Grants to schools other than day secondary schools.

The Special Advisory Committee of Heads of Secondary Schools appointed to confer with the Department with reference to the extended Programmes and Regulations of Science and Art instruction met on Tuesday, 6th June, 1905, at the offices of the Department, 4, Upper Merrion-street.

The Committee had under consideration the revised programme of Experimental Science, Drawing, Manual Instruction, and Domestic Economy for Day Secondary Schools, Session 1905-6.

**Present:—Mr. George Fletcher, F.G.S.,** Assistant Secretary in respect of Technical Instruction, in the chair; **Rev. William Anderson, M.A.,** Mountjoy School, Dublin; **Very Rev. M. Barrett, D.Ph.,** St. Colman's College, Fermoy; **Very Rev. E. A. Crehan, C.S.Sp.,** Blackrock College; **Mr. W. W. Haslett, M.A.,** St. Andrew's College, Dublin; **Mr. Thomas A. Finch, M.A.,** Educational Institution, Dundalk; **Mr. R. M. Jones, M.A.,** Royal Academical Institute, Belfast; **Mr. James Moore, B.A.,** Masonic Orphan Boys' School, Dublin; **Very Rev. J. A. Moran, S.M., B.A.,** St. Mary's College, Dundalk; **Rev. Brother P. J. Hennessy,** Christian Brothers', Marino, Clontarf; **Mrs. Thompson, M.A.,** Alexandra College, Dublin; and **Mr. J. D. Daly, M.A.,** who acted as Secretary to the meeting.

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On Thursday, 22nd June, a meeting of the Department's Advisory Committee on Live Stock (exclusive of horses) was held at the offices of the Department, 4, Upper Merrion-street, when the following were present:—**The Right Hon. Sir Horace Plunkett, P.C., K.C.V.O., F.R.S.,** Vice-President

(in the chair); Mr. R. A. Anderson, Mr. James Byrne, J.P.; Colonel N. T. Everard, D.L.; Mr. William Field, M.P.; Mr. Toler R. Garvey, J.P.; Mr. Nicholas B. King, Captain J. Lewis Riall, D.L.; Mr. T. P. Gill, Secretary of the Department; Professor J. R. Campbell, Assistant Secretary in respect of Agriculture; Mr. J. S. Gordon, Chief Inspector for Agriculture, and Mr. J. V. Coyle.

On the 23rd June the Department's Advisory Committee on Horse-breeding met at the offices of the Department. There were present:—The Right Hon. Sir Horace Plunkett, P.C., K.C.V.O., F.R.S., Vice-President of the Department (in the chair); Major Balfo, D.L.; Mr. James Daly, Mr. Arthur M'Mahon, Mr. P. J. O'Neill, J.P.; Mr. William Pallin, F.R.C.V.S.; Right Hon. Lord Rathdonnell, H.M.L.; Mr. J. Robson, Mr. Hugh P. Ryan, Right Hon. Frederick S. Wrench, P.C.; Mr. T. P. Gill, Secretary of the Department; Professor J. R. Campbell, Assistant Secretary in respect of Agriculture; Mr. J. S. Gordon, Chief Inspector for Agriculture; Mr. M. J. Cleary, M.R.C.V.S., Veterinary Inspector, and Mr. J. V. Coyle.

The Advisory Committees had under consideration the suggestions submitted by the County Committees of Agriculture as to certain modifications in the Department's Live Stock Schemes for the season 1906.

At the invitation of H. M. the King of Italy delegates from almost every nation of the world met at Rome, in May last, to discuss the advisability of forming an International Chamber of Agriculture, and, if thought desirable, to take steps for the formation of such an institute. The Conference was presided over by His Excellency M. Tittoni, the Italian Secretary of State for Foreign Affairs, and the delegates representing Great Britain and Ireland were:—His Excellency the Right Hon. Sir Edwin H. Egerton, G.C.M.G., the Earl of Jersey, G.C.B., G.C.M.G., the Earl of Minto, G.C.M.G., Sir Thomas Henry Elliot, K.C.B., of the Board of Agriculture and Fisheries, and Mr. T. P. Gill, of the Department of Agriculture and Technical Instruction for Ireland. Sir Charles Edward Buck, K.C.S.I., attended the Conference on behalf of the Government of India.

In a series of meetings held from the 29th May to 6th June the Conference formulated the text of a Convention which is to be sub-

mitted for the approval of the respective Governments. The Convention consists of a number of Articles dealing with the foundation, constitution, and working methods of the proposed new Institute. The scope, powers and functions of the Institute are defined by the ninth Article to the following effect:—The Institute will collect, arrange and publish statistical, technical and economic reports concerning agriculture, agricultural products—animal and vegetable alike—the trade in agricultural products and the current prices of such commodities in the different markets, and communicate this information to those interested. The Institute will publish accounts of the rates of agricultural wages prevailing in different districts. Warning will be given of the appearance of any new disease affecting agricultural products and, when possible, the methods most effective in dealing with the disease will be indicated. Information on all such subjects as agricultural co-operation, insurance and credit, will be collected and circulated, and, if it should seem desirable, the Institute will from time to time make suggestions to Governments or any Government as to any action which may make for the general agricultural interest.

All questions touching the economic interests, legislation and administration within a particular State are to be excluded from the competence of the Institute.

The Convention concludes with a scheme arranging the voting power and fixing the amount of contribution by each State adhering to the Institute.

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The fourth Congress organised by the Irish Technical Instruction Association was held in Limerick on the 7th, 8th, and 9th June, 1905. In response to the invitation of the Standing Council of the Association, the Department were officially represented at the Congress by Mr. George Fletcher, F.G.S., Assistant Secretary in respect of Technical Instruction, and Mr. J. D. Daly M.A.

The following resolutions were adopted:—

“That this Congress deplures the limited extent to which the Evening Continuation Schools’ Scheme of the National Board is availed of, this being, in our opinion, mainly attributable to the present restrictive regulations of the Board, and we invite the

National Board to exert a further effort to secure an extension of the number of Evening Continuation Schools."

"That this Congress is of opinion, having regard to the development of Technical Instruction since the passing of the Act of 1899, and the growing needs of the Technical Schools, that a much larger grant is absolutely necessary. That in furtherance of this Resolution a deputation from the Congress and the Irish Members wait upon the Treasury to ask: (a) an increased annual grant for Technical Education; (b) a special grant for building funds; (c) that the Department should have a Scheme of Distribution of the Science and Art Funds suitable to the wants of Ireland. The Deputation to consist of Most Rev. Dr. Sheehan, Dr. Windle, President, Queen's College, Cork; Rev. P. J. Dowling, Sir James Power, Mr. John Mulligan, and some Irish Members of Parliament."

"That the Report of the Sub-Committee on Continuation Schools be adopted, and embodied in the Official Report of this "Congress."

"That in the distribution of funds to County Boroughs a limit should be fixed, beyond which these funds should not be lessened, provided this fixing such limit for the Boroughs does not injuriously affect the interests of County and Urban District areas."

"That this Congress again affirm the want of co-ordination in the Primary, Intermediate, and Technical Schools, and is of opinion that real co-ordination is impossible until the question of higher education is settled on a basis satisfactory to the whole people of Ireland."

"That this Congress requests the various Technical Committees comprising the Association to take into earnest consideration the various queries formulated by the Department in No. 13 of Agenda Paper, and to forward their views to the Hon. Secretary, Rev. P. J. Dowling, c.m., not later than September 1st, 1905." No. 13 reads—"The Department invites the Congress to give information: (a) As to the experience gained from Itinerant Courses of Instruction, and the best methods of securing continuity of work in centres of such Instruction; (b) how best to secure co-ordination between Urban and County Schemes of Technical Instruction; (c) the working of schemes under County Committees of Technical Instruction appointed under Section 14 (2) of the Agriculture and Technical Instruction (Ireland) Act,

1899; (d) co-ordination between neighbouring Counties as to the joint employment of expert teachers, &c. ; (e) collection of information regarding existing and lapsed local industries, whose interests the Technical Instruction Schemes might be made to serve."

"That this Congress urges the Department that it would be most desirable to provide scholarships for the Training of Trades' Teachers, the Scholarships to be held in the best centres of Instruction in the case of each trade."

"That the Committees be strongly urged to press on the Department the necessity of establishing a Scheme of Travelling Scholarships in Art, Science, and Technological subjects, whereby a more extended knowledge of these subjects may be acquired than is possible in Ireland under present conditions."

"That the time at the disposal of apprentices being entirely inadequate, we urge on the employers the advisability of granting further opportunities by allowing their apprentices a few hours' leave upon such days as they undertake to attend the Technical School Classes, and, furthermore, we impress upon the organizations of workmen the importance of increasing their practical interest in Technical Education."

"That some means be taken by which local teaching bodies may have a voice in selecting the City and Guilds' examiners."

"That we request the Department to use their best efforts to get the National Board of Education to continue in Primary Schools the course of instruction in Elementary Experimental Science, and the necessary equipment for such teaching, carried on for the past five years, but now given up, to the great loss of Technical Education."

"That Resolution No. 12, as follows—'That the Resolution No. 6, of the Belfast Congress, be rescinded, and that the Congress consider whether there should not be established and maintained an official journal under the control of the Association'—be referred to the Standing Council for consideration and report."

"That the best thanks of this Congress, representing fifty-four Technical Committees throughout the country, be given to the Mayor, High Sheriff, and Reception Committee of Limerick, for the kindness and hospitality shown to the delegates; to the Earl of Dunraven for permission given to visit his demesne and mansion; to the railway companies for travelling facilities

afforded the delegates; to the representatives of the Department of Agriculture and Technical Instruction, and of the Commissioners of National Education, for valuable help given during the discussion; to the Superioress of the Training College, Sir Thomas Cleeve, Messrs. Bannatyne, Shaw, O'Callaghan, the Managers of the Limerick Clothing Factory and the Power Station for the courtesy and attention shown to the delegates in visiting their establishments; and to the Press for the valuable reports of the Congress."

Of Danish agricultural products the exports amounted to 18,200,000*l.*; that is about 522,000*l.* more than in 1903, which was a very prosperous year for all kinds of agriculture. As to other goods there was a decrease of about 300,000*l.*, so that the total increase in the exports was about 222,000*l.*

As far as the export of Danish agricultural produce is concerned there was during 1904 a decrease compared with the preceding year in eggs, butter and meat.

The value of Danish eggs exported in 1903 was 1,511,000*l.*, in 1904 only 1,378,000*l.*, and this decrease is due to a corresponding decrease in the quantity exported, viz., from 23,250,000 to 21,200,000 score, and this falling-off is principally due to the hot weather which ruined a large number of eggs for export. The Russian competition in this branch of trade is very strong, and it appears that shells of Danish eggs are rather thin and that in consequence there is a large percentage of breakage. The attention, however, of the Danish producer has been called to this fact, and for the future care will be taken to provide more chalk and pulverised shells (oyster and mussel) for hens. As usual almost all the eggs are sent to the United Kingdom.

The total export of Danish butter during 1904 was 1,630,600 cwts. against 1,602,600 cwts. in 1903, showing an increase of 28,000 cwts.; but as the butter prices during the whole year were 2*s.* to 3*s.* per cwt. lower than in 1903, there was a decrease in value amounting to about 22,000*l.* The total export of all butter from Denmark was 1,957,500 cwts. The bulk of the butter exported

went to the United Kingdom, viz., 1,780,000 cwts., which was about 100,000 cwts. less than in 1903, but this balance was exported to Germany, and it is looked upon with much satisfaction that there is now another market, which in years when production is great can take the surplus and prevent the British market being over-stocked. The butter in transit *via* Denmark is mostly Finnish and Siberian butter.

The export of tinned butter reached 380,000 cwts., only slightly in advance of that during 1903, when it reached 370,000 cwts.

On account of the suspicion which has frequently been entertained that the butter consumed in Denmark and exported from Denmark was often Finnish or Russian of an inferior quality, which was passed on as Danish, the Danish Government appointed during 1904 a Commission for the purpose of drawing up regulations

which would at least guarantee the  
also help to preserve the good re-  
pute of Danish butter in foreign countries. As a result, a  
**Butter Legislation.** origin of agricultural produce, and would  
Bill was introduced into the Rigsdag during the Session 1904-05, and one of the sections prescribed that in all Danish butter casks there should be one stave of each cask branded with some distinctive mark, and it was proposed that the so-called "horn mark," which has been adopted by most of the Danish dairies, should be the mark, official and otherwise; but the regulations proposed concerning the origin of the butter were combined with some rules as to the mixing of Danish and American lard, and as those created considerable discussion, the Bill did not pass. It is probable that during the Session 1905-6 this Bill will become law.

The quantity of bacon exported was 1,853,800 cwts., which shows a considerable increase when compared with  
**The Bacon Trade.** 1903, when exports amounted to 1,614,200 cwts. Almost the whole was shipped to the British market, viz., 1,840,000 cwts.

The value of the quantity exported in 1904 was 4,460,000*l.* (in 1903 4,154,000*l.*). The small increase in the value compared with the quantity is accounted for in the low prices which were paid for bacon in the United Kingdom during the whole of the year. The total number of animals killed for export in Denmark was, during 1904 about 1,700,000, and during some weeks 40,000 were slaughtered. If the development in the production increases in the future in the same proportion there is hardly any doubt but that



the prices paid for Danish bacon must go down, as there is no other market than the British, and there it has to compete with the Irish and Canadian. In spite of the low prices there is no doubt that the production is a profitable one as long as the feeding is carried on in an economical and rational way. At the end of 1904 the animals suffered from a disease in the joints, caused, so it is said, by the dryness of the food and fodder, and those that suffered from this disease were under the average weight and the bacon was of an inferior quality. The disease is cured, I understand, by means of cod-liver oil mixed with a preparation of phosphorus. The sanitary control by the Danish Government of bacon shipped to the United Kingdom has been rendered much stricter.

The export of fresh meat has also increased considerably in quantity, and amounted to 25,000 cwts. (about) during 1904. Other kinds such as sausages, tongues, &c., amounted to 135,000 cwts. The value was, however, about 100,000*l.* less than in 1893 on account of lower prices due to a falling-off in quality.

There has been a marked increase in exports of live cattle. The number of bullocks and cows exported was 90,791, or 28,872 animals more than in 1903, and the value increased from 800,000*l.* to 1,400,000*l.*

The export of wool, potatoes, vegetables, raw bones and tallow also increased in value.

In manufactured goods which are exported from Denmark one may mention straw ropes, butter casks, all kinds of dairy machinery, refrigerating and ice-making machines.

The production of cement was about 1,200,000 barrels of 470 lbs each, or 282,000 tons, produced by five mills. A considerable part is exported to the United Kingdom and to transatlantic ports, where Danish cement has acquired a very good repute.

The export of raw chalk to Germany, Sweden, Norway, Russia and Scotland was the same as in 1903, the value being about 11,000*l.* The whole production was about 320,000 tons, and from this amount about 74,000 tons, value 5,400*l.*, was exported. Pulverised chalk to the amount of about 1,625 tons, value 1,200*l.*, was also exported.

Another export article is flint pebbles used in cement mills.

Considerable quantities of these round stones have lately been found on the coasts of Denmark, especially on the Island of Langeland.

During the last few years frequent experiments and trials have been made in using petroleum motors for fishing boats, and several Danish manufacturers have been successful in constructing them, and it is stated that they can very easily be attended to and repaired by unskilled hands. These motors have sufficient power for all sizes of boats, and many have been fitted with them, whilst the sale has increased, and Norway, France, the United Kingdom and Germany have bought them.

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Mr. Consul Villiers states in his report on the Fishing and other industries of the Faroe Islands (Cd. 2236-148-1905) that the question of auxiliary power to sailing vessels has become one of increasing importance. In the Shetland Isles it has been declared vitally important for the herring fishing. A benzine motor boat has been plying among the islands for some time, but petroleum motors are now chiefly attracting public attention. More than one fishing smack has already been satisfactorily supplied with a petroleum motor, giving a speed of 6 or 7 knots. The first was a vessel of about 50 tons. Smacks are thus able to enter harbour promptly with their catch, and leave again at will for the fishing banks, without waiting for the chance of a favourable breeze. The present motor boats are Danish. It is stated that their management can be learnt by an inexperienced man in one day. It is hoped that something also will be found suitable for the Faroese open fishing boats, with which experiments are now being made.

Reference has been made in previous reports to the "grind" or drive and slaughter of herds of small whales. A novel feature in a grind last August (1904) was the assistance given during the drive by a small motor boat. It was cleverly handled along the coast of Sudero. Occasionally, as the whales seemed to hesitate as to the direction they would take, the motor backed towards the herd. The approach of the churning screw soon decided the course of the whales, which were driven into bay; 163 were killed that day.

Mr. Consul de Zuccato in his report on the Trade and Commerce  
**Art Industries** of Venice\* gives an account of some of the  
**at Venice.** art industries practised in that city.

The industry of stamped leather has lately been revived with  
 great success. In olden times mediæval

**Leather Work.** castles were ornamented with tanned hides,  
 painted, chiselled, engraved, or printed in

the most delicate manner. The hides used are soft sheep-  
 skins for small articles as book-binding, pocket books, parchments,  
 &c.; calf-skin, which is harder; cow-hide, which is fit for wall  
 decoration, carpets and heavy things; morocco leather of all tints;  
 horse and pig-skins, which are employed to make figured coverings  
 for furniture. The leather is wetted, then the design is traced and  
 the work begins. Flowers and other designs are selected for print-  
 ing, engraving, chiselling, impressing, pyrogravure, carving or  
 mosaic working. The *modus operandi* is as follows:—

*Printing.*—The outline of the drawing is dilated with the finger,  
 or a stylus, and filled in with wax.

*Engraving.*—The design is cut with a knife, then the parts cut  
 are opened with a roe foot to allow the gold or other colours to  
 pass.

*Chiselling.*—There are two modes: By modelling the design with  
 a small hammer, or by small openings made on the skin to cause  
 it to swell and so to bring images, figures, &c., into relief.

*Pyrogravure.*—Burning, by cauterisation, the surface of the de-  
 sign. It may subsequently be embellished by varnishing it with  
 gold or other colours.

*Mosaic Work.*—Differently coloured little squares of morocco  
 leather are applied on the design, stuck with glue and then pressed  
 on the leather with a plane.

The above are in a few words the principal operations to be per-  
 formed, but it would be too long to enumerate the subsequent  
 processes required to give the finishing touches to artistic leather.

The lace industry has continued to progress and new show  
 rooms have been opened in St. Marks.

**Lace Making.** Simple lace made with artistic taste so as to  
 show well on any dress can be obtained at  
 moderate prices. On the other hand, not only perfect imitations  
 of rose point, Valenciennes, Brussels and Venetian old lace are

manufactured, but also original works, in different designs, according to such styles are created for any one who may wish to procure superior artistic lace at a comparatively cheap price.

A great quantity of lace is exported to all countries of Europe and America. Lately a good market has been found in the Argentine Republic. Irish and Venetian laces are in demand there on account of their moderate prices, and it is said that there would be a greater development if the producers would put themselves in direct communication with the purchasers in the Argentine Republic instead of dealing through commission agents in Hamburg and Paris. With regard to the different varieties of lace to be sent, the best plan would be to follow the Paris fashions.

There has lately been a great demand for Venetian mosaics for internal and external mural decorations in Europe and America. The new system of exporting ready-made mosaics has given a great development to this branch of trade. The cartoon to be copied is exhibited before the artists on the spot, who fix the tesserae on that section of the cartoon assigned to them with common paste; when each workman has executed his work the mosaic is put together and again divided into sections, each section being numbered and carefully packed. The key plan forwarded to the consignee will enable him to have all the sections pressed in the cement freshly laid on the wall, and when the cement has properly hardened, the paper on which the tesserae have been pasted is removed and a perfect mosaic is seen.

Mosaic art is now carried on in the United Kingdom, and orders for the pieces of enamel on tessere, to be made according to the instructions of the firms in the United Kingdom, are sent here. Purchasers of such enamels must be careful in entrusting their orders to reliable firms, and not look to cheaper prices, which in the end would prove dearer to them. As the enamel pieces are sold by weight, when they are composed of coarser and heavier materials a smaller number of pieces per unit results, and a consequent smaller surface can be covered. Besides, the quality of the colours used in the composition of the enamels has also a great influence on the beauty and durability of the mosaics.

The bootmakers' technical school at Wermelskirchen in Prussia\*

**Bootmakers'  
Technical School  
in Prussia.**

was opened in 1903, and is the first school of its kind founded for the promotion of the bootmaking trades in Germany. It is intended for the instruction of managers, foremen and pattern cutters; but workmen who wish to perfect themselves in certain branches are also admitted.

Intending pupils must be at least 16 years old, in good health and strength, and must have passed through the elementary schools. The length of the instruction, which is both theoretical and practical, is dependent upon the measure of completeness aimed at by the pupils. Those who wish to become managers attend the school for two years, working 84 weeks of 44 hours each, whilst those who only wish to become foremen work for one year, or 42 weeks of 44 hours each. Workmen and others who wish to perfect themselves in certain special branches take only the number of hours necessary for this purpose.

The fees amount to £12 10s. per annum for Germans, and to £62 10s. for foreigners. Workmen pay £2 10s. per quarter, and "Outsiders" (*Hospitaten*) £20 per annum if they are Germans, and £100 if they are foreigners. All fees are paid in advance, and are only returned in special cases. Poor and diligent pupils are wholly or partially dispensed from fees. Pupils must also pay the cost price of spoilt raw materials.

GENERAL PLAN OF INSTRUCTION.

	No. of Hours in	
	Theoretical Instruction.	Practical Instruction.
COURSE ON THE UPPER PART OF THE BOOT.		
I.		
Freehand drawing for practising drawing and pattern cutting, ... ..	—	4
Pattern cutting by hand and with a measuring machine, ... ..	—	5
Instruction as to shaping and pegging, ... ..	1	—
II.		
Laying out the leather, ... ..	—	1
Cutting the leather, ... ..	—	7
Instruction in goods and examining raw material, also in tanning, ... ..	1	—
Technical calculation, ... ..	1	—
Carried forward, ... ..	8	17

\* See Diplomatic and Consular Report, No. 630, Miscellaneous Series.

GENERAL PLAN OF INSTRUCTION—*continued.*

	No. of Hours in	
	Theoretical Instruction.	Practical Instruction.
Brought forward, ... ..	3	17
III.		
Preparation of the cut out parts ... ..	—	2
Stitching the legs in divided work, also in single work, including finishing, ... ..	—	15
Instruction in binding the legs, ... ..	1	—
Instruction in auxiliary articles, ... ..	1	—
Instruction in machinery and drawing, ... ..	1	—
Wages, ... ..	1	—
Calculation and management, ... ..	1	—
Total, ... ..	8	34
COURSE ON THE LOWER PART OF THE BOOT.		
I.		
Freehand drawing as practice for drawing and cutting patterns, ... ..	—	1
Pattern cutting for soles by hand and with the measuring machine, ... ..	—	1
General instructions in forms, ... ..	1	—
II.		
Cutting up and marking out the leather, ... ..	—	2
Leather punching, ... ..	—	2
Instruction as to goods and examination of raw material, also in tanning, ... ..	1	—
Technical calculation, ... ..	1	—
III.		
Preparation of cut out pieces, ... ..	—	2
Pegging legs in divided work, and also in single work, ... ..	—	8
Machining, ... ..	—	16
Finishing, ... ..	—	2
Instructions in binding the soles, ... ..	1	—
Instruction in auxiliary articles, ... ..	1	—
Instruction in machines and drawings, ... ..	1	—
Wages, ... ..	1	—
Calculation and management, ... ..	1	—
Total, ... ..	8	34
FOR BOTH COURSES.		
Instruction on the build of the foot, cause and means of avoiding foot troubles, ... ..	1	—
Making suitable lasts, ... ..	1	—
Separate instruction, ... ..	8	34
Total, ... ..	10	34

## DETAILS OF THE SUBJECTS OF INSTRUCTION.

Subjects.	Details of the Course of Instruction.
Leg patterns, ...	<p>(A) COURSE ON THE UPPER PART OF THE BOOT.</p> <p>(a.) Designing leg patterns for regular and irregular lasts to various measurements.</p> <p>(b.) Cutting the patterns in parts as lining, border or trimming and boot upper patterns, &amp;c.</p> <p>(c.) Putting patterns together.</p> <p>(d.) Pattern cutting in stages by hand and with graded machines</p> <p><i>Details:</i> Thorough description of all kinds of legs or shanks with reference to pattern designing and divided work, new methods of pegging being taken into consideration; details for the description and storage of patterns in connection with the lists of kinds and automatic checking of the cutting out; explaining the most suitable machines, appliances and tools, also goods and raw materials.</p>
Cutting out, ...	<p>(a.) Laying out the leather in all sorts and sizes with several patterns.</p> <p>(b.) Cutting out various legs and linings of raw material.</p> <p>(c.) Calculation of the value of the cut-out parts and waste.</p> <p>(d.) Utilisation of waste pieces for useful parts, and generally.</p> <p><i>Details:</i> Thorough description of all kinds of upper leather and the methods of tanning them, divided work, control as regards time and consumption of raw material; information as to suitable sizes of leather, sources of supply and price, also the utilisation of waste; explanation of the most suitable machines, appliances, tools, and booking in general.</p>
Making legs. ...	<p>(a.) The preparation of the legs.</p> <p>(b.) The stitching together of the legs.</p> <p>(c.) Calculation of the cost of stitching.</p> <p>(d.) Calculation of auxiliaries.</p> <p><i>Details:</i> Thorough description of the best methods of making the principal commercial goods, and finer kinds of goods in connection with divided work, excluding pasting as far as it can be dispensed with; knowledge and operation of various special machines for making legs; examination of and judging auxiliary substances; information as to checking work and raw material and also wages.</p>
Preparing soles,...	<p>(B) COURSE ON THE LOWER PART OF THE BOOT.</p> <p>(a.) Designing bases of grading for forms of soles and heels.</p> <p>(b.) Cutting patterns of soles, in-soles, and heels in sizes by hand and with graded machines.</p> <p>(c.) Designing heel knives, curves for rasping knives and discs for glazing and polishing, also sectional curves.</p> <p>(d.) Dividing, selecting and stamping sole leather.</p> <p>(e.) Calculation of values of cut parts, waste pieces and methods of preparing them.</p> <p><i>Details:</i> Thorough description of the ways of making soles and preparation of sole leather; knowledge and handling of various kinds of preparatory machines; handling of sole leather with reference to dressing; description of the kinds of sole leather and their methods of tanning, also construction of heels; instruction as to suitable weights of leather and source of supply and utilisation of waste; checking time and consumption of raw material.</p>

DETAILS OF THE SUBJECTS OF INSTRUCTION--*continued.*

Subjects.	Details of the Course of Instruction.
<p>Forming soles, ...</p> <p>Dressing soles, ...</p>	<p>(B.) COURSE ON THE LOWER PART OF THE BOOT--<i>continued.</i></p> <p>(a.) Hand and machine pegging.</p> <p>(b.) Work in all sole fastening machines up to the pegging of the upper.</p> <p>(c.) Forming heels and nailing on.  <i>Details:</i> Thorough description of the pegging operations; the advantages of distributed pegging and formed heel and toe caps; preferable construction of heels, also knowledge and handling of various special machines; checking work and wages.</p> <p>(a.) Working of dressing machines.</p> <p>(b.) The treatment of the dressing auxiliaries.</p> <p>(c.) Operation of dressing by the warm and cold processes.</p> <p>(d.) Finishing, blocking, and polishing.  <i>Details:</i> Thorough description of the dressing process; knowledge and handling of dressing machines, also information as to their effectiveness; instruction as to finishing the treatment of leather with the flat iron, and dressings according to quality and condition; wages, supervision of work and storage.</p>
<p>General know- ledge.</p>	<p>FOR BOTH DEPARTMENTS.</p> <p>(a.) Instruction on the construction of the foot.</p> <p>(b.) Making suitable lasts.</p> <p>(c.) Cause and means of avoiding foot troubles.  <i>Details:</i> Thorough description of the construction of the bones, muscles and tendons in ordinary and diseased feet; instruction in the movement of the various kinds of feet when walking; action of the same in combination with the spoor, the design of the soles and the upper parts of lasts, and in connection therewith the making of lasts of wood or wood pulp; formation of the seam and spring instep after the manner of shoe goods, form of the sole, height of the heel and method of making; making foot coverings for ordinary and crippled feet to the form of the foot; moulding the foot in plaster.</p>

Wermelskirchen is a small but very busy manufacturing town not far from Elberfeld, with a population of 16,000 souls. It contains not less than nineteen leather and boot works for whose benefit the school has been founded.

The school is a municipal institute under State supervision and in receipt of State support. It is managed by a Director with the assistance of the school council composed of the local State Councillor, the Mayor of the town, two representatives nominated by the President of the Province, two members of the Town Council, a member of the local Chamber of Commerce, and two delegates of the boot trades.



The expenditure for the erection of the school building was borne by the town, the State contributing £1,250. As the fees taken do not cover the annual expenditure the State contributes annually £500, the Rhine Province £250, and the Bootmakers' Association £100.

In addition to the Director of the school, the practical instruction lies in the hands of two picked foremen; the theoretical and other instruction is given by two masters.

Fully qualified pupils who have passed through the full two years' course may submit themselves to an examination for a manager's certificate. For a foreman's certificate only one year is necessary. Other pupils receive certificates merely stating the time and subjects they have attended.

At the beginning of the present year the Colonial Office sent Mr. Rider Haggard as a Special Commissioner to the United States to inspect and report on the conditions and character of the agricultural and industrial settlements which have been established there by the Salvation Army, with a view, if the experiment should be found successful, to the establishment of a system for the transmigration of suitable persons from the great cities of the United Kingdom to different parts of the British Empire. Mr. Rider Haggard having visited the Salvation Army land colonies in California, Colorado and Ohio, and having had interviews on the subject with many important persons, including President Roosevelt and Sir Wilfrid Laurier, has presented his report, which the Colonial Office has just issued as a blue-book (Cd. 2562-1905). As the result of his study of the working of the Salvation Army settlements, Mr. Rider Haggard, after pointing out mistakes which have been made and failures resulting in a total loss of £10,000 on the two colonies in California and Colorado—due to unforeseen difficulties—gives the following conclusions from the lessons learned:

The first of these lessons is to avoid the mistakes of the past, especially by refusing to attempt any further settlement unless sufficient capital is available to inaugurate and to carry it on upon approved and business-like principles. The second is that the land should be cheap as well as suitable.

The third that the Colonists should be very carefully selected, all the circumstances and conditions of the individual families being considered. The fourth that they should pay a fair price for their land, spread, however, over a considerable number of years, and the fifth, perhaps the most important of them all, that they should remain during that period under skilled, but sympathetic management. Markets also, with the accessibility and convenience of location, should be borne in mind, while the principle of settlement in communities ought to receive strict adherence, as it has many social and other advantages. It might also be found wise to form the individual communities of persons collected from the same town, or district.

Given these requisites, Mr. Haggard thinks it will be strange if success is not attained even in the case of poor persons taken from the cities, provided that they are steady in character, the victims of misfortune, and circumstances rather than of vice, and provided that they have had some acquaintance or connection with the land in their past lives, and have also an earnest desire to raise themselves and their children in the world.

Mr. Haggard then proceeds to outline a plan of land settlement which, he says, has received the approval of President Roosevelt, Sir Wilfred Laurier, Mr. Wilson, and Mr. Sifton, to whom he submitted it.

The following summary of the scheme extracted from the report

**Mr. Haggard's** will indicate its character:  
**Scheme.**

1. That the interest of a loan, or, loans, of an amount to be fixed hereafter, should be guaranteed by the Imperial Government, or by the Imperial and certain Colonial Governments jointly, if that is thought desirable.

2. That the Poor Law authorities in the large cities of Great Britain should be approached in order to ascertain whether they would be prepared to make a *per capita* contribution for every selected family taken off the local rates.

3. That a permanent officer should be appointed by the Imperial Government, to be known as the Superintendent of Land Settlements.

4. That the Salvation Army, or any other well-established and approved social, charitable, or religious organisation, should

be deputed to carry out the work of selecting, distributing, and organising the settlers on land colonies anywhere within the boundaries of the British Empire.

5. That no title to land should be given to any colonist until he had discharged his share of the liabilities, on which he should pay 5 per cent. interest and 1 per cent. sinking fund, recoverable in an agreed period of years.

6. That the possibility of establishing similar colonies in the United Kingdom should be carefully considered.

7. That, if these suggestions are approved, a Bill, to be designated the "National Land Settlements Act," embodying and giving life to them, should be laid before Parliament.

For the funds for the undertaking the Commissioner suggests that a sufficient loan, whereof the exact

**The Financial  
Aspect of the  
Scheme.**

amount may be decided hereafter, or rather the interest on such loan, shall be guaranteed by His Majesty's Government, or, in cases where the Governments of individual Colonies are willing to co-operate, by His Majesty's Government and such Colonies jointly; it being agreed that each Colony shall share in the benefits of the Land Settlements to be made under the loan in proportion to the amount of its guarantee plus the value of its land grants.

The absolute necessity of such a loan by whomsoever guaranteed is obvious, but if further argument in its favour are needed they will be found in the histories of Fort Romie and Fort Amity, which the Salvation Army have acquired and developed on credit, by means of money borrowed at 5 per cent. and 6 per cent., thereby incurring the greater part of their loss. If land settlement is to be successful it must be conducted upon the strictest business lines, such as would be adopted if the building of a railway or any other industrial enterprise were concerned, and these, of course, include the provision of sufficient capital at a reasonable rate of interest.

If such capital is not forthcoming Mr. Haggard thinks it would be better to leave the scheme untouched, since to undertake it relying upon a Trust-in-Providence system of finance would be to court disaster, and possibly to throw the movement back for many years. Nor can the gifts and contributions of the rich, or any other form of charity, which is often fickle in its preferences and uncertain in its action, be depended on in such a case. To relieve our congested

cities, and place those that are suitable among their people upon the empty or depopulated lands of the British Empire is a work which the Empire should undertake for its own general good.

When this question of a guarantee comes up for discussion, however, it will be worth while considering as to whether the large Municipalities of the United Kingdom should not be asked in what shape they would be prepared to assist the movement so far as the law allows, or by emendation can be made to allow. Probably they could best do this by promising a fixed sum towards the expenses of any indigent, but deserving and suitable family who might be taken off their rates. The same suggestion applies to the Poor Law Unions throughout the land. Of course all such contributions would be purely voluntary, but that difficulty might to some extent be met by giving preference in the matter of the emigration of families to those towns and Unions which elect to pay such contributions.

The capital being found, it will next be convenient to consider the exact objects upon which it should be expended, and how these objects can best be attained.

**The use and need of Land Settlements.** First, what are those objects? To relieve, at any rate to some extent, the congestion of our cities which results in so much degradation, misery and expense to the public, by exporting from them those who are physically, mentally, and in other ways suitable, and who are found to have fallen into, or to be threatened with poverty, or who, being weary of towns, desire to attempt the adventure of a different life in new homes upon the land. Secondly to advantage the Empire by the introduction on its unoccupied spaces of large numbers of persons whose existence otherwise would have been wasted.

An obvious criticism will be that such persons taken from cities, however willing they may prove to go when in extremity, are not suitable for the purposes of land settlement at home or abroad. Also, that even if they were, it would be difficult, if not impossible, to select them properly, and quite impossible when selected to manage them through that period of years during which they must be nursed into success.

The answer is that even in a single great city such as London, where, last Christmas, over 127,000 persons were in receipt of Poor Law Relief, if only hands can be laid upon them, there are numbers of indigent people who are in every way fitted

to such purposes. For instance, here may be found many men and women, brought up upon the land, who have drifted to the town, perhaps recently, and failed there, and who now in middle life, with a family of young children, would accept with the utmost gratitude the chance of returning to conditions such as formed the company and surroundings of their youth.

Some useful information relating to the imports of agricultural produce into Great Britain appears in the **Agricultural Imports into the United Kingdom.** Report on the Agricultural Statistics for 1904 (Cd. 2,594--1905) just issued by the Board of Agriculture and Fisheries. It appears that fewer horses were again imported in 1904. The material decline of the last three years is thus carried farther, the 18,000 horses received from abroad comparing with the import of 27,000 in 1903, or about two-fifths of the average arrivals of the five years 1896-1900, prior to which there had been a steady increase for some fifteen years.

The live cattle imports of 1904 numbered nearly 550,000 head, or 27,000 more than in 1903, and imports of sheep also increased by 28,000 head. The increase in both cases came from the United States, whence 100,000 more cattle and 123,000 more sheep were received than in 1903, or practically 30 per cent. and 72 per cent. respectively.

The total export of meat from Argentina to this country was not diminished by the stoppage of the live-stock trade, as carcasses were shipped instead of live animals. **Dead Meat.** Fresh beef from that country increased by 523,000 cwts., or more than 45 per cent., and although the United States furnished less by 300,000 cwts., the total receipts of fresh beef in the United Kingdom in 1904 were greater on the whole by nearly 200,000 cwts. Of fresh mutton, it may on the other hand be noted, we received the smallest supply of the past four years; the shortage, as compared with 1903, being over 500,000 cwts., or 13 per cent., the chief source of these supplies, New Zealand, sending only 1,627,000 cwts. as against 2,035,000 cwts. in 1903. Fresh pork also declined in quantity by some 13 per cent. due to the decrease in Dutch and American

shipments, while bacon, particularly of Danish and Canadian origin, again increased after the reduced supplies of the two preceding years.

Butter imports continue to grow in volume with an increase of 180,000 cwts. in the past year over

**Dairy Produce.** the large figures noted in 1903. These increased butter supplies came from British colonies, which altogether nearly doubled their quota of 1903. From Australia (chiefly Victoria and New South Wales) we obtained 480,000 cwts., just four times as much as in 1903, while from New Zealand and Canada large increases were also received. It may be noted that this is the first occasion upon which the Colonies have collectively sent us over 50,000 tons of butter. The more important foreign sources of import—Denmark, Russia, France, Holland, and Sweden—exhibited a more or less marked decline. The large growth of the trade in imported eggs has been a marked feature of late years; but the increase was upon this occasion comparatively small, and the quota furnished by Denmark and by Canada fell off. Russia continues to be very much the largest contributor of eggs to our markets, with nearly double the supply from either Denmark or Germany, the two next largest sources of this import.

The chief feature in the grain trade of 1904 has been the failure of the United States to furnish us with more

**Wheat and Flour** than a very small portion of our wheat.  
**Imports.** But notwithstanding the remarkable restriction of the supplies from this quarter, the aggregate amount (including wheat flour expressed as grain) from all countries exceeded even the unprecedentedly large receipts of 1903. Out of the great total of over 118,000,000 cwts., the United States supplied only 18,500,000 cwts., thus losing for the first time the pre-eminence that it has occupied in this respect for so many years, and occupying only the fourth place among the contributories of the year. The first place was taken by India, whence we derived 25,500,000 cwts., but this was closely followed by Russia's contribution of 23,700,000 cwts., and by that of Argentina, which reached 21,800,000 cwts. None of these three countries had previously sent us so large an amount in any one year. India especially has in 1904 surpassed its large aggregate of 1903 by as much as 50 per cent. Australia sent also the largest amount yet

received thence or 11,300,000 cwts. (as against practically nothing in 1903), thus exceeding the Canadian contribution of just over 9,000,000 cwts.

The United States has always been the largest contributor to this country of wheat in the form of flour; but, owing to the relatively poor American yield of wheat in 1904, little more than half the quantity of 1903 was last year received from that country, and although the European supplies increased, the total importation of wheat flour has not been so small since 1889. The total amount received, 14,723,000 cwts., was not much over two-thirds of the supply of the preceding year.

There was again some increase in the imports of barley into the United Kingdom in 1904, but the receipts of

**Other Cereals.**      oats fell off somewhat considerably. Of maize the imports declined from 50,000,000 to under 43,000,000 cwts., this being due mainly to shortage of American shipments, which were less than half their volume in 1903. Argentina contributed more than half the total imports of maize in 1904, and the 23,266,000 cwts. received thence represented the largest amount hitherto imported from that quarter, the figure even exceeding in aggregate weight the large totals of the wheat exports of that country.

Imports of wool were much below the average, having been lower only in 1900 during the previous decade. A similar remark applies to the re-exports of this commodity, and the net amount retained for consumption, 314,000,000 lbs., is the lowest of the last ten years, and so small a quantity as 220,000,000 lbs. of wool has not been received from Australia since 1878.

The Report\* of the Fishery Board for Scotland on the Fisheries of Scotland for the year 1904 has just been

**The Scotch Sea Fisheries in 1904.**      issued:—The year's results are the highest on record in the productiveness of the sea-fisheries of Scotland. The best year hitherto was 1902, with 6,866,028 cwts. In 1904 the total catch reached 7,947,829 cwts., or 1,081,801 cwts. more than in 1902, and 1,429,021 cwts. more than in the immediately preceding year.

\* Cd. 2547—1905.

In the matter of value, however, the catch of 1904 does not compare so favourably, being lower than that of either 1902 or 1903. The total value of the fish landed in Scotland in 1904 was £2,231,102; in 1903, £2,401,287; and in 1902, £2,502,668.

This decrease in value, concurrently with an increase in quantity, is accounted for by the preponderance of herrings in the year's catch (5,432,494 cwts., against 4,279,485 cwts. in 1903). There was no falling-off, however, in the catch of white fish, either in quantity or value. On the contrary, 1904 was a record year in both respects in this branch of the fishery.

This result was obtained through the agency of 10,891 vessels, of a total tonnage of 140,396, and an aggregate value, with their gear, of £3,431,284. This shows a decrease of 117 boats from the previous year, which is about the average rate for the past five years. It shows also a slight decrease (135 tons) in the tonnage, or rather a temporary arrestment of the rapid increase of recent years.

Of the 10,891 vessels thus employed in the direct work of fishing during 1904, 10,417, of the value of £997,067, were boats propelled by sails or oars. In number, therefore, 95 per cent. of the fishing boats of Scotland are sailing vessels. In 1904 the number of sailing vessels decreased

#### **Classification of Vessels.**

by 155, but at the same time their value increased by £2,515, caused by the elimination of the smaller and less efficient boats, and their replacement by larger and more valuable vessels.

Of the 474 steam-propelled vessels, 270, of the value of £1,102,350, were engaged in trawling, and 204, of the value of £453,095, fished with lines for white fish, or with drift nets for herrings.

Steam-trawlers have not during 1904 maintained the rate of progress that for a period of nine years previously had been continuous and unbroken. Whether this check is merely temporary remains to be seen. But in face of the facts of the history of the trawling industry, it is safe to assume its temporary and passing character. The decrease of 10 in their number does not seem, however, to have affected the productiveness of the fishing by this method, the result of which was 1,705,600 cwts., against 1,566,000 in 1903.

Steam vessels other than trawlers, however, show an increase. In 1895 the steam liners and steam drifters combined amounted to only 46 of the value of £72,030, while last year they numbered 204 of the value of £453,095. This shows an increase of nearly 350 per



cent. in number and of about 530 per cent. in value within the decade—a much greater increase than that of trawlers within the same period.

The herring fishery, the most widely beneficial branch of the Scottish fishing industry, was unusually productive. For 1904 the catch reached the total figure of 5,432,494 cwts. (1,552,141 crans), being 1,153,009 cwts. (329,431 crans) more than in the preceding year, or 678,450 cwts. (193,843 crans) more than the highest catch previously recorded.

To this result the District of Shetland contributed no less than 1,901,357 cwts. (543,245 crans).

Unfortunately, however, the prices obtained by the fishermen for their catches did not maintain the level of the previous year, with the result that though the gross catch as stated above was 1,153,009 cwts. more than in the preceding year the value was £227,115 less, showing the lowest rate per cwt. since 1894.

This branch of the Scottish fishing industry was in a sense more successful than even the herring fishing, for, though the increase in quantity was not so proportionately large as in the case of the herring fishing, yet the increase extended to the value as well.

Indeed, 1904 shows the highest catch on record for the white-fish fishery by 290,400 cwts. in quantity, and £57,055 in value.

The total number of persons employed in connection with the fisheries was 86,621, an increase over the preceding year of 2,068. Of these, the men and boys who manned the boats numbered 36,260. Of this number, 31,984, or 88 per cent. manned the sailing fleet; 1,639, or 5 per cent., manned the steamers engaged in line and net fishing; while 2,637, or 7 per cent., were engaged on trawlers.

A conference was held on 22nd June between representatives of Sea Fishery Authorities and the Board of Agriculture and Fisheries on matters affecting the sea-fishing industry. On behalf of the Board of Agriculture and Fisheries, Mr. Ailwyn Fellowes acknowledged that not much had resulted from such conferences in the past in the way of legislation, but he hoped

that, the Fisheries having been taken from an over-burdened department like the Board of Trade and given to the Board of Agriculture, something would be done for the great fishing industry. Many of the matters on which legislation was sought required money, and unfortunately the Imperial finances were not in such a state as to allow of money being spent at present on sea fisheries. He hoped that in future there would be more meetings of the officials of the Board of Agriculture and Fisheries and the representatives of the sea fisheries districts for dealing with local fishery problems and also for promoting legislation applicable to the whole Kingdom.

The conference then entered upon a discussion regarding some of the subjects which were thought to call for particular attention, such as the protection of under-sized fish, the pollution of estuaries, the inspection of shell-fish beds, and the necessity of Imperial grants being given to local fisheries committees for fishery research. At the conclusion of the conference Sir Thomas Elliott, K.C.B., Secretary to the Board of Agriculture and Fisheries, said it was the desire of the Board to further in every way the great sea-fishing industry of the country.

The most satisfactory result in connection with the work carried out by the Animals' Section of the Board of Agriculture and Fisheries\* during 1904, has been the decrease of Swine-Fever. It must be admitted that the owners of swine throughout Great Britain cannot at the present time be accused of failing to report suspected cases of this disease among their animals; this is evidenced by the fact that during the year 1904 reports of 9,147 suspected cases have been received at the Department, of which only 1,196 were confirmed by the Officers of the Board. What is most encouraging in this connection is the fact that the number of outbreaks continued to decrease during the last months of the year.

Ten years have elapsed since the Board were called upon to undertake the extremely difficult task of eradicating this obscure and troublesome disease, which has never yet been successfully dealt with in any country where it has once obtained any degree of

\* Proceedings under the Diseases of Animals Acts, &c., C.D. 2454—1905.

prevalence. The present is, therefore, a convenient period for reviewing the results of the work carried out during that period. In 1894 (which was the first complete year after the Board had accepted this duty) the disease was reported from 73 counties in Great Britain, 5,682 outbreaks were confirmed by the Veterinary Officers, and no fewer than 56,296 swine were slaughtered. In the year 1904, however, the disease was reported from 64 counties, while the number of outbreaks confirmed has fallen to 1,196, and only 5,603 swine were slaughtered as diseased, or as having been in contact.

Swine-Fever must necessarily be one of the most difficult of all the contagious diseases of animals to exterminate, because in the case of animals of six months old and upward, it is often so occult that the owners are frequently unaware that their pigs are affected, and for this reason a large number of centres of infection escape notice altogether. It is a matter of by no means uncommon occurrence when the Veterinary Officers of the Board are examining the intestines of contact pigs, in London, to discover that some of them have already passed through the active stage of the disease and recovered, without the owner having the least idea that animals had been affected.

The only unsatisfactory feature in connection with Swine-Fever at the present time is, that although the outbreaks in Great Britain have been very materially reduced, it is almost as widely distributed now as it was in 1894. The number of counties infected in the year 1904 was 64, compared with 73 in 1894, being only nine less than ten years ago, outbreaks having occurred during 1904 in every county in England with the exceptions of Rutland and Westmorland.

It was with regret that the Board found themselves compelled in the course of the autumn to make an Order regulating the landing in Great Britain of Swine from Ireland. It was, however, felt that in the absence of any general restrictions upon the movement of swine in Ireland similar to those almost universally adopted in Great Britain, the unrestricted movement in Great Britain of swine landed from Ireland could not be defended, and that if measures were not taken to control such movement a loophole would exist through which the introduction and spread of Swine-Fever might be effected in a manner which would jeopardise the success of the measures taken in this country.

There has been a further considerable rise in the number of reported outbreaks of Anthrax, the total in 1904 hav-

**Anthrax.** ing reached 1,049 as compared with 767 in 1903 and 678 in 1902. The numbers of animals attacked were returned as 1,589, 1,143, and 1,032 in each of the years cited. The increase in outbreaks was most marked in Cheshire, where they rose from 23 in 1903 to 88 in 1904. In Devonshire the outbreaks rose from 14 to 35, in Gloucestershire from 11 to 47, in Lancashire from 44 to 59, in Shropshire from 11 to 47, in Aberdeenshire from 82 to 111, and in Banff from 13 to 34. In the West Riding of Yorkshire there were 37 outbreaks in 1904 as against 34 in 1903.

Unfortunately Glanders has shown a tendency to increase in many parts of Great Britain, and some of the counties which were free in 1903 have become infected in 1904. The outbreaks reported in 1874 were only 522, and the number of horses attacked 636, but in 1904 they increased to 1,529 and 2,658 respectively.

There is no doubt that Glanders, like Pleuro-Pneumonia, is constantly being spread by animals affected with the disease in an occult form. For many years a futile attempt was made to eradicate Pleuro-Pneumonia by slaughtering only those animals which were obviously affected, and it was not until the Pleuro-Pneumonia Act of 1890 was passed, giving the Board power to slaughter all cattle which had been in contact with diseased animals, or exposed to infection, that any satisfactory results were obtained.

The measures adopted for the eradication of Pleuro-Pneumonia were costly, amounting in all, after deducting salvage for carcasses, to about £218,512, but the agriculturalists and the nation alike are now reaping the benefit of the good work that has been done by the Department. The disease was exterminated ten years ago, and so long as the present legislation as regards the importation of foreign cattle is adhered to, it can never be reintroduced.

Slaughter of all horses in contact with disease is not, however, necessary in Glanders; it would be sufficient to deal only with horses that reacted to the Mallein test, carried out at various intervals of time under the direct supervision of the expert Veterinarian. It is therefore reasonable to conclude that Glanders might be stamped out at a less cost than Pleuro-Pneumonia. If an agent having an equally diagnostic power to Mallein could have been

employed in outbreaks of Pleuro-Pneumonia, the cost attached to the eradication of that disease would certainly have been considerably less.

Sheep-Scab has been less prevalent in 1904 than in any previous year since 1889, and the outbreaks are one-third less than in 1903. The present would therefore be an opportune moment for taking some very stringent measures for dealing with the disease.

Unfortunately there exists a certain number of owners of sheep of little value, who seem to attach little importance to Scab, with the result that their diseased sheep are a constant source of danger to neighbouring flocks.

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Numerous complaints have in past seasons been made to the Department regarding the condition in which soft fruits, particularly strawberries and raspberries, are offered for sale. Some growers doubtless realise the importance of this matter and offer only fruit that has been gathered in good condition and packed in suitable cases. On the other hand, it is certain that many farmers expend much labour on growing good fruit, but receive only moderate prices for it because of their neglect in the selection of the fruit for sale. Jam manufacturers complain that soft fruits are frequently delivered in bad condition, being over ripe, soft and dark in colour, or mixed with green or white immature fruits. This causes much trouble and expense to the manufacturer, and a greatly reduced price is consequently paid to the grower. Moreover, owing to external conditions, such as the increased price of sugar, the manufacture of jam in Ireland in the future is likely to be restricted to fruit of the highest quality. The greatest loss, therefore, will fall upon growers of second-rate fruit.

The attention of all growers is directed to the following points:—

1. Strawberries and raspberries should be pulled while firm and well coloured, and before they become soft or dark.
2. Strawberries that have been in contact with the ground and are covered with sand should not be offered for sale.
3. Small *white* berries should not be pulled.
4. Black currants should be gathered when turning black; all stems should be removed and no *green* fruit included,

5. Delays in transit should be avoided, and the fruit should be despatched as early in the day as possible.

6. Greater attention to cleanliness and to the details of gathering and marketing are essential.

It has been intimated to the Department that the failure to comply with the above-mentioned conditions has been due to the scarcity of suitable labour. This difficulty has been overcome in England by inducing young people from the towns to go and work during the season in the fruit districts.

In the Report (Cd. 2594—1905) just issued by the Board of Agriculture and Fisheries on the Agricultural Statistics of Great Britain, an interesting section deals with an endeavour that has been made to bring under convenient review with the statistical position of British Agriculture the more or less parallel conditions of Agriculture abroad. The latest available official information has been utilised for this purpose, but as the foreign data are necessarily incomplete, wide intervals often occurring in the collection and publication of the particulars desired, while the methods of distinguishing the facts differ in different countries, care must be exercised in drawing deductions from the statistics.

As a rule information is more readily obtainable, either in the form of statistical returns or official estimates, on the point of the production and area of the principal grain crops than it is as regards the enumerated totals of the different forms of live stock. For the fourteen most important countries the acreage of wheat is available for the year 1904, but seven of the fourteen reports are those of our own country and its Indian, Canadian, and Australasian Possessions. In the case of only seven foreign States, viz., France, Germany, Austria, Italy, and Roumania in Europe, and the United States of America and Argentina on the other side of the Atlantic, is this particular information forthcoming. The wheat areas of five other European States come down it would appear to 1903 only, while for Spanish and Japanese figures on this point we have to go back to 1902, for Algerian data and for the small Danish area the information is not later than for 1901,

and in the case of Norway and Servia it is still as remote as 1900. In certain cases estimates of produce from areas not yet apparently ascertained are forthcoming, and in the table wherein I have for the first time added particulars of the agriculture of Mexico the estimates given are of produce only.

These considerations are not to be overlooked when attempts are made to form an opinion as to the aggregate crop of any particular cereal in a given year, and impede a solution of the problem, which has been sometimes discussed, whether the area under wheat is, or is not, extending in the same ratio as the numbers of the wheat-consuming population of the world.

Imperfect as the official data nevertheless are, it is not without interest to note that the tables now supplied suggest that, without taking account of the cultivation pursued in countries whence no official records have been furnished, some 30 separate national units of wheat-growing report, at the most recent available date, a total acreage of about 219,000,000 acres under this cereal. Grouping some of the units thus separately accounted for, as it is permissible to do under three national flags, the Russian Empire with its Asiatic possessions, the British Empire with its Indian territories and Colonial possessions, and the broad areas of the United States of America, furnish quite two-thirds of the aggregate wheat area just quoted. Their relative magnitude in this respect, and the estimated produce roughly credited to each for the latest year, may be not unfairly shewn as under:—

States.	Area under Wheat	Estimated Production.	Yield per Acre.
	Acrea.	Quarters.	Bushels.
Russian Empire, ... ..	57,000,000	77,000,000	10·8
United States of America, ... ..	44,000,000	67,000,000	12·1
British Empire, ... ..	40,000,000	69,000,000	13·8

It is right to remember that in constructing such a table at this moment the American quota is put relatively somewhat low owing to the unfavourable character of the latest harvest, and the British Empire's yield, owing to the large Indian crop of 1904, is probably unduly high. But, whatever allowance might have to be made were average areas and average crops to be measured, there is no State which comes near contesting the position of the three above enumerated as large wheat producers. The low average yield per

acre of territories so vast and varied is an incident to be expected, for the means above given include in each group results realised under very different conditions. Nowhere for an area of equal size is so high a yield obtained as in Great Britain herself with a return of 31 bushels per acre over the last ten years. But in an Imperial average we have to count with the meagre yield of our Australian colonies and of some parts of India where the wheat production may fall to seven bushels to the acre, while similar low estimates for Russian Siberia and for the Southern States of the American Union leave their mark on the average in each case. With narrower areas higher average yields are obtainable, and the next largest group of wheat-growing States may be said to be formed as under, crediting to France—as in the case of Russia and of the British Empire—her non-European wheatfields in Algeria.

States.	Area under Wheat.	Estimated Production.	Yield per Acre.
	Acres.	Quarters.	Bushels.
France, with Algeria, ... ..	19,000,000	39,040,000	16
Italy, ... ..	12,760,000	18,000,000	11
Austria-Hungary, ... ..	11,800,000	28,000,000	19
Argentina, ... ..	10,700,000	16,000,000	12
Spain, ... ..	9,000,000	17,600,000	15
Germany, ... ..	4,700,000	17,000,000	30
Roumania, ... ..	4,300,000	6,500,000	12

Practically these seven countries among them grow 72,000,000 acres, which is just half as large a surface as the 141,000,000 acres of the three great States quoted above, but they supply about two-thirds of the crop furnished by Russia, the United States and our own Empire jointly. The collective wheat area of other minor European States is under 4,000,000 acres, of which Bulgaria and Servia probably account for three-fourths, while to include in this analysis the officially recorded wheat acreage of Uruguay in the West, and of Japan in the East, would not quite add another two million acres to the record given above.

Turning to the returns of Live Stock for the countries of Europe, it would seem from these tables that so late a year as 1904, only the figures for the United Kingdom and those for Russia can be compared. To go back one year earlier would bring within review the numbers officially reported for one

**Foreign Live  
Stock.**



important country, France, and for four whose herds and flocks are small, Belgium, Holland, Denmark, and Sweden. Certain figures for Switzerland can be had for 1901, and there are statistics for 1900 available for the German Empire, Austria, Norway, Roumania, and Servia. From neither Hungary, Spain, nor Italy have statistics on this point been received since 1895-1891, and 1890 respectively. But taking in each case the last available year of the five, 1900—1904, inclusive, it may be interesting to compare, in the order of their last recorded human population, what cattle and sheep are apparently in the possession of each state, adding the measured area as an index of the character of the territory compared.

States.	Population No.	Surface Acres.	Cattle No.	Sheep No.
	Millions.	Millions.	Millions	Millions.
Russia in Europe, ... ..	105	1,276	33.2	47.5
Germany, ... ..	58	134	18.9	9.7
United Kingdom, ... ..	43	78	11.6	29.1
France, ... ..	39	130	14.1	18.0
Austria, ... ..	26	74	9.5	2.6

Three-fourths of the cattle, and rather more than two-thirds of the sheep of the European countries, whose official statistics of Live Stock are shown in the appended tables, are to be found in the five States just enumerated; and the density of their herds and flocks at the present time compares as under both as regard their area and their human population.

States.	Per 1,000 Persons.		Per 1,000 acres of surface.	
	Cattle.	Sheep.	Cattle.	Sheep.
Russia in Europe, ... ..	316	461	26	37
Germany, ... ..	326	168	142	73
United Kingdom, ... ..	270	677	148	374
France, ... ..	362	461	103	137
Austria, ... ..	365	100	128	35

Thus stated, the numbers of the Live Stock show that the United Kingdom owns fewer cattle, but very many more sheep in proportion to population than its larger European neighbours.

Moreover, notwithstanding the rare use of cattle here for agricultural labour when compared with the customary practice of other European states, the herds we maintain by our agricultural system show a greater density per acre of surface than is displayed even in Germany, where cattle have so lately been largely augmented as the stocks of sheep have declined. The character of the surface is doubtless a governing factor in determining what stock can be profitably kept, and, if the above comparisons were extended to some countries of minor area, a considerably larger head of cattle would be found to be maintained per 1,000 acres of surface than we can show here. In Denmark, Holland, and Belgium, where the keeping of sheep is a very insignificant feature of the farming practice, the number of cattle per 1,000 acres thus ranges from 194 to 236. If a comparison be made with population the numbers seem small in the two latter states, whereas in Denmark they rise to a proportion not elsewhere to be found in Europe, giving a ratio of 733 head of cattle to every 1,000 persons.

An approximate idea of the most recent movement towards increase or decrease in Live Stock is given in the comparative summaries at the end of the Report, but the defective records available do not enable the position to be exactly compared in detail with any uniform series of earlier dates in different countries. So far as the herds of the five leading European countries are concerned, there would appear to have been a general advance in numbers. The combined herds of Russia, Germany, France, Austria, and the United Kingdom are greater by nearly 22 per cent. than they were some thirty years ago. If the older figures may be trusted, the percentage rise in Austria was the greatest, or something like 28 per cent. as against 20 per cent. in France and Germany, and 13 per cent. in our own country. But except in our own case the gain in cattle has been attended by a large shrinkage in the flocks of sheep maintained.

The changes in the position of the flocks of Continental Europe are indeed the most remarkable of the agricultural movements of recent years. At about 1873, from which date fairly continuous annual statistics are available, France had nearly 26,000,000 sheep, and Germany 25,000,000; the latest statistics credit these countries with but 18,000,000 in the first case, and less than 10,000,000 head in the second. In Germany the reduction of sheep appears to have been continuous, judging from the five isolated years of

enumeration in 1873, 1883, 1892, 1897 and 1900. In France nearly 4,500,000 of the loss of sheep occurred between 1873 and 1882. The level of the French flocks were then maintained up to 1899, from which date a further fall in numbers, amounting to another 3,500,000, has been recorded, while the experience of these two great countries is repeated elsewhere in many states of the Old World. The Austrian flocks are thus only half what they were and those of Hungary, when last enumerated—some ten years ago—had up to that time dropped from 15,000,000 to 8,000,000 head. No such decline in the flocks in the United Kingdom has to be set against the development in our stock of cattle, and the fall that has to be noted here is in no way comparable to the losses elsewhere in Europe. In 1873 we had 34,000,000 sheep enumerated, as against 29,000,000 in 1904, or a percentage decline of no more than 15, while the flocks of Germany are fewer by 60 per cent., and those of France by more than 30 per cent.

The usual half-yearly Report (Cd. 2519-1905) on the Banking and Railway Statistics, Ireland, for the December half-year has just been issued by the Department. An analysis of the tables dealing with the Banking Statistics shows that in December, 1904, there was an increase of Deposits and Cash Balances in the Irish Joint Stock Banks as compared with the corresponding period in 1903, amounting to £716,000; that there was an increase of £298,000 in the Deposits in Savings Banks in Ireland in December, 1904, as compared with the close of the year 1903, there having been an increase of £300,000 in the sum in the Post Office Savings Banks, and a decrease of £2,000 in the amount in the Trustees Banks; that the amount (in December, 1904) of Government Funds, India Stocks, Guaranteed Land Stock, Guaranteed 2½ per cent. Stock (Land Purchase Act, 1903), and War Stock, on which dividends are payable at the Bank of Ireland, shows an increase of £1,273,000 as compared with the amount at the close of the preceding year.

Turning to a consideration of the statistics of the Co-operative Credit Associations in Ireland for the year 1903\* it appears that

\* For the Statistics of these Associations for the years 1898-1902, see the Report "Banking and Railway Statistics, Ireland" for the half-year ended 31st December, 1903, issued by the Department. [Cd. 2109-1904.]

the number of Societies registered has increased during the year 1903 from 145 to 201. The total number of Societies returned as working during 1903 amounts to 142 as compared with 98 returned as working in 1902. The membership of the total number of Societies registered up to the end of 1903, has reached the number of 7,917 as compared with 6,611 in December, 1902. The total loans granted during the year 1903 amounted to £20,435 16s. 4d. as compared with £15,447 2s. 2d. in 1902, an increase of £4,988 14s. 2d. The loan capital which consists of (1) loans obtained from the Congested Districts Board, the Department of Agriculture and Technical Instruction and the Joint Stock Banks, and (2) deposits made by members of the Co-operative Credit Associations) has increased to £19,588 14s. 10½d., as compared with £13,956 10s. 9d., an increase of £5,632 4s. 1½d.

A review of the weekly traffic returns for Irish Railways shows that in 33 weeks the receipts exceeded those for the corresponding weeks of the year 1903, and in 19 weeks the receipts were below those for the corresponding periods, with the net result that the total receipts for the 52 weeks of the year 1904, amounted to £3,952,150, an increase of £16,154, or 0·4 per cent., as compared with the amount received in the preceding year. The total receipts for the year 1904 (52 weeks) were, as above stated, £3,952,150, as against £3,677,679 in 1901, £3,681,018 in 1900, £3,952,150, as against £3,935,996 in 1903, 3,910,925 in 1902, £3,677,679 in 1901, £3,681,018 in 1900, £3,600,293 in 1899, £3,493,389 in 1898, £3,442,036 in 1897, £3,387,409 in 1896, £3,368,282 in 1895, £3,303,739 in 1894, £3,181,043 in 1893, £3,103,651 in 1892, and £3,147,458 in 1891, when the receipts were higher than those for any previous year.

The annual White Paper setting forth the Emigration Statistics of Ireland for the year 1904 (Cd. 2467-1905)

**Emigration from Ireland in 1904.** has just been issued. According to this return 37,415 persons—17,524 males and 19,891 females—or 8·5 per cent. of the estimated population left Ireland last year; and the total number of persons who have left their country for other lands since 1851 now reaches the huge total of 3,997,913. Of the natives of Ireland who emigrated last year, 4,517 went from the province of Leinster,

12,606 from the province of Munster, 10,156 from the province of Ulster, and 9,623 from the province of Connaught. The county which contributed the greatest number to the total was Cork, 4,481 persons having left that county during the year. Galway sent away 3,406 persons, and Mayo 3,103. Galway had the highest rate of departure, 17·7 persons per thousand having left in 1904. The county having the fewest emigrants was Wicklow, and this county had also the lowest rate of loss. As usual most of the emigrants were of the peasant or "general service" class, over 22,600 belonging to this class, and by far the largest proportion—over 30,000—went to the United States, or more than 82 per cent. Great Britain absorbed 9·4 per cent., and Canada 5·6 per cent.

Short Summer Courses for teachers are being conducted by the Department of Agriculture and Technical Instruction for Ireland, as usual, during the month of July. The courses comprise instruction in the following subjects:—Experimental Science (Physics, Chemistry, Mechanical Science, Botany, and Physiology and Hygiene), Drawing and Modelling, Manual Instruction (Woodwork); Building Construction; Wood-carving and Modelling. A course of instruction in Lace and Crochet-making, Sprigging and Drawn Threadwork has also been arranged. Besides these public courses, special courses in Experimental Science, Drawing and Modelling, and Domestic Economy are also being conducted for teachers who are members of enclosed religious orders.

The institutions at which the public courses are being conducted are:—Royal College of Science, Dublin; Metropolitan School of Art, Dublin; Queen's College, Belfast; City of Dublin Technical School; Christian Schools at North Richmond-street, Dublin; Our Lady's Mount, Cork, Tramore, and at Marino, Clontarf; St. Andrew's College, Dublin; and the Crawford Municipal Institute, Cork.

The number of teacher-students attending the courses shows a slight increase on last year, the figures being 837 for 1905, as contrasted with 813 for 1904. The number of teacher-students attending for instruction in the several subjects is as follows:—First Year Syllabus of the Preliminary Course of Experimental Science, 143; Second Year Syllabus of the

**Short Summer  
Courses of Instruction  
to Teachers, 1905.**

**Teachers  
attending the  
Courses.**

Preliminary Course of Experimental Science, 91; Special Course in Physics, 106; Special Course in Chemistry, 118; Special Course in Mechanical Science, 11; Special Course in Botany, 13; Special Course in Physiology and Hygiene, 32; Drawing and Modelling, 143; Manual Instruction (Woodwork), 18; Building Construction, 14; Woodcarving and Modelling, 21; Course for Teachers of Lace and Crochet-making, 39; Domestic Economy, 88.

The following staff of instructors has been engaged for the Courses:—

FOR EXPERIMENTAL SCIENCE.—Professor G. H. Carpenter, B.Sc.; Professor T. Johnson, D.Sc., F.I.S.; Professor E. A. Letts, D.Sc., Ph.D., F.R.U.I.; Professor J. Lyon, M.A.; Professor A. W. C. Menzies, M.A., B.Sc.; Professor W. B. Morton, M.A., F.R.U.I.; Professor Hugh Ryan, M.A., D.Sc., F.R.U.I.; Professor W. H. Thompson, M.D., F.R.C.S.; Messrs. G. T. Bates, B.A.; A. Boon, B.A., B.Sc.; W. Brown, B.Sc.; J. Comerton, B.Sc.; A. Coulthard, B.Sc.; J. M. Daggart, M.A.; F. O'Brien Ellison, B.A.; H. E. Hadley, B.Sc.; John Hawthorne, M.A., Ph.D.; T. Alex. W. Hill, B.Sc.; A. S. M. Imrie, M.A., B.Sc.; C. J. Leaper; J. M'Ewen, A.R.C.S. (London); R. Macdonald, M.A., B.Sc.; J. Middleton, B.Sc.; A. O'Farrelly, M.A.; J. Holms Pollok, D.Sc.; James Quick; T. F. Rutter; E. Heber Smith, B.A., A.R.C.S. (Lond.); J. Taylor, M.Sc., J. Taylor, B.A., A.R.C.Sc.I.; G. H. Woollatt, Ph.D.; J. Young, A.R.C.S., (Lond.); Messrs. J. A. Adams, M.A.; R. G. Allen, A.R.C.Sc.I.; H. M. Atkinson, B.Sc., Ph.D.; P. E. Belas, A.R.C.Sc.I.; R. W. Blair, A.R.C.Sc.I.; R. F. Blake, F.S.C., F.I.C.; W. H. Cadman, B.Sc. F.C.S.; J. A. Clarke; M. Donegan, A.R.C.Sc.I.; J. J. Hughes Dowling, A.R.C.Sc.I.; S. A. Edmonds, A.R.C.Sc.I.; George Hanlon, B.A.; E. P. Harrison, Ph.D.; James J. Hutchinson; A. T. J. Kersey, A.R.C.S. (Lond.); C. A. King, A.R.C.Sc.I.; E. M. Le Fluffy, B.A., A.R.C.Sc.I.; A. G. G. Leonard, A.R.C.Sc.I.; W. J. Lyons, B.A., A.R.C.S. (Lond.); W. J. Macdonald, B.A.; James L. M'Kee; D. Mellon, A.R.C.Sc.I.; Thomas Melville; W. Sloan Mills, M.A.; A. Neale, A.R.C.Sc.I.; Harold Norminton, M.Sc.; Maurice J. O'Connor; Rev. James Quinn, B.A.; J. F. Reid; A. L. Robinson, B.A.; Frank Seymour, B.A.; J. Totton; T. B. Vinycomb, M.A.; F. W. Warwick, A.R.C.Sc.I.; J. P. Waters, B.A.; William J. Wren, A.R.C.Sc.I.; John Wylie, B.A.; Frank Young, B.Sc.; and Misses Hilda P. Martin, B.A.; M. A. Ryan, B.A.; and E. M. M. White, A.R.C.Sc.I.

FOR DRAWING AND MODELLING.—Mr. R. H. A. Willis, A.R.C.A. (Lond.); Messrs. George Atkinson; Hugh C. Charde; Frederick

Luke, A.R.C.A. (Lond.); Oliver Sheppard, R.H.A.; Percy L. Squire, W. L. Whelan; Mrs. Barden; Misses Margaret Blacklay; Edith Emerson; Alice Jacob; and Elizabeth O'Kelly.

FOR LACE AND CROCHET MAKING, SPRIGGING AND DRAWN THREAD WORK.—Mr. W. A. Mulligan, A.R.C.A. (Lond.); Mrs. Allen; Misses B. Gallagher, Nora Galvin, Ellen Marron, Edith Percival, S. A. Reynolds, and Bella Whitelegge.

FOR MANUAL INSTRUCTION—BUILDING CONSTRUCTION AND WOODCARVING.—Messrs. E. Holden; Andreas Lang; G. W. Ridsdale; F. W. Sinclair; and George Thompson.

FOR DOMESTIC ECONOMY.—Misses A. T. Barry, Hannah Cox, M. A. Cullinan, Alice Farrell, Kathleen Foley, J. B. Knox, A. M. McCarthy, C. E. Moore, Lilian J. Park, Elizabeth E. E. de B. Powell, K. Shuley, and B. Wiber.

The first of these competitions (see *Journal*, Vol. V. No. 3, pp. 536, *et seq*) for the year 1905 took place on the 2nd June. Exhibits were received from 117 creameries. The judges were four in number, consisting of representative butter merchants of Birmingham, Cork, Glasgow, and Manchester. On the recommendation of the judges prizes were awarded to the under-mentioned competitors:—Irvinestown Co-operative Agricultural and Dairy Society; Bride Valley Creamery (Newmarket Dairy Co., Ltd.); Rathkenny Co-operative Agricultural and Dairy Society; Solohead Co-operative Agricultural and Dairy Society; Ballyrashane Co-operative Agricultural and Dairy Society; Centenary Co-operative Creamery Co., Ltd.; Leckpatrick Co-operative Agricultural and Dairy Society; Doons Co-operative Agricultural and Dairy Society; Pomeroy Co-operative Agricultural and Dairy Society; Killasnett Co-operative Agricultural and Dairy Society; Lissarda Co-operative Dairy Society; Ballintrillick Co-operative Agricultural and Dairy Society; Killyman Co-operative Agricultural and Dairy Society; North Kerry Creamery Co.; Drumquin Creamery (Proprietary); Granagh Co-operative Dairy Society; Kilmallock Creamery Co. (Proprietary); Scottish Co-operative Wholesale Society, Enniskillen.

The second of these competitions took place on the 6th July. Exhibits were received from 112 creameries. The judges were

four in number, consisting of representative butter merchants of Limerick, Liverpool, London and Manchester. On the recommendation of the judges prizes were awarded to the under-mentioned competitors:—Bansha Co-operative Agricultural and Dairy Society; Scottish Co-operative Wholesale Society, Enniskillen; Ardagh Co-operative Dairy Society; Doons Co-operative Agricultural and Dairy Society; Killasnett Co-operative Agricultural and Dairy Society; Piltown Co-operative Agricultural and Dairy Society; Newcastle West Co-operative Agricultural and Dairy Society; Longford Co-operative Agricultural and Dairy Society; Monagea Co-operative Agricultural and Dairy Society; Castlecaulfield Co-operative Agricultural and Dairy Society; Dromclough (Co-operative Wholesale Society) Creamery; Granard Co-operative Dairy Society; Solohead Co-operative Agricultural and Dairy Society; Finn Valley Co-operative Agricultural and Dairy Society; Omagh Co-operative Agricultural and Dairy Society; Greenane (Co-operative Wholesale Society) Creamery; Killen Co-operative Dairy Society; Kiltoghert Co-operative Agricultural and Dairy Society; Knockulty (Newmarket Dairy Co.) Creamery; Springfield Co-operative Agricultural and Dairy Society.





## STATISTICAL TABLES.

## FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast.				East Coast.			
	1905.		1904.		1905.		1904.	
	Quantity.	Value.	Quantity.	Value	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	.	.	30	40	34	124
Soles, . . . . .	.	.	.	.	30	105	18	151
Turbot, . . . . .	.	.	.	.	21	114	20	144
Total Prime Fish, . . . . .	.	.	.	.	81	259	72	419
Cod, . . . . .	21	20	140	80	3,181	2,186	2,251	1,544
Conger Eel, . . . . .	1	1	1	1	672	344	821	485
Haddock, . . . . .	109	62	309	122	598	678	911	1,040
Hake, . . . . .	.	.	.	.	659	1,078	1,058	1,120
Herrings, . . . . .	.	.	41	10	.	.	.	.
Ling, . . . . .	1	1	1	1	703	703	229	118
Mackerel, . . . . .	.	.	.	.	.	.	.	.
Plaice, . . . . .	71	72	113	113	1,244	1,311	692	932
Ray or Skate, . . . . .	7	3	12	4	933	713	1,274	450
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	.	.	27	8	696	686	1,151	787
All other except Shell Fish, . . . . .	.	.	159	41	1,659	854	2,753	1,301
Total, . . . . .	210	159	803	380	10,426	8,812	11,212	8,196
SHELL FISH :—	No.		No.		No.		No.	
Crabs, . . . . .	.	.	.	.	360	2	170	2
Lobsters, . . . . .	.	.	.	.	1,178	53	1,467	64
Mussels, . . . . .	Cwts.		Cwts.		Cwts. 505	65	Cwts. 345	43
Oysters, . . . . .	No.		No.		No. 11,910	42	No. 4,850	20
Other Shell Fish, . . . . .	Cwts.		Cwts.		Cwts. 465	100	Cwts. 230	79
Total, . . . . .	.	.	.	.	.	322	.	208
Total Value of Fish landed, . . . . .	.	159	.	380	.	9,134	.	8,404

NOTE—The above figures are subject to

## IRELAND.

as landed on the IRISH COASTS during the month of **March**, 1905, as corresponding period in 1904.

South Coast.				West Coast.				Total.			
1905.		1904.		1905.		1904.		1905.		1904.	
Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
1	2	2	3	.	.	.	.	31	42	36	127
14	68	17	77	897	1,941	202	947	441	2,114	237	1,175
1	2	1	1	8	43	27	117	30	159	48	262
16	72	20	81	405	1,984	229	1,064	502	2,315	321	1,564
10	14	39	35	613	307	1,508	613	3,830	2,527	3,938	2,272
.	.	.	.	16	7	123	42	689	352	945	528
1	2	1	1	256	194	600	340	964	936	1,821	1,503
.	.	11	4	.	.	20	7	659	1,078	1,089	1,131
203	27	.	.	949	210	1,020	273	1,152	237	1,061	283
.	.	188	61	300	174	859	345	1,004	878	1,277	525
61	35	26	14	51	34	5	3	112	69	31	17
102	70	247	189	332	273	298	232	1,740	1,726	1,350	1,466
.	.	6	1	100	25	60	18	1,040	741	1,361	473
.	.	.	.	.	.	.	.	.	.	.	.
11	3	100	52	314	181	722	385	1,021	870	2,000	1,232
66	48	85	47	227	213	82	69	1,951	1,115	3,079	1,458
469	271	723	485	3,568	3,602	5,535	3,391	14,673	12,844	18,273	12,452
No.	.	No.	.	No.	.	No.	.	No.	2	No.	2
.	.	.	.	.	.	.	.	360	91	170	137
.	.	283	19	904	38	1,366	54	2,082	93	3,116	73
Cwts.	.	Cwts.	.	Cwts.	28	Cwts.	30	Cwts.	878	Cwts.	747
No.	11	No.	14	No.	.	No.	31	No.	53	No.	66
5,544	47	5,425	46	1,001	175	25,893	147	17,454	382	36,168	272
Cwts.	359	Cwts.	317	Cwts.	1,001	Cwts.	862	Cwts.	1,825	Cwts.	1,409
.	53	.	79	.	241	.	262	.	621	.	549
.	329	.	564	.	3,843	.	3,653	.	13,465	.	13,001

correction in the Annual Returns.

## FISHERY STATISTICS—

STATEMENT of the Total QUANTITY and VALUE of the FISH returned compared with the

	North Coast				East Coast.			
	1905.		1904.		1905.		1904.	
	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.	Quan- tity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	1	2	14	20	19	66
Soles, . . . . .	4	15	.	.	30	201	26	214
Turbot, . . . . .	.	.	1	2	20	108	13	76
Total Prime Fish, . . . . .	4	15	2	4	64	329	58	356
Cod, . . . . .	50	49	256	86	1,116	830	792	635
Conger Eel, . . . . .	1	1	.	.	499	265	465	298
Haddock, . . . . .	151	73	56	24	344	355	347	417
Hake, . . . . .	.	.	.	.	318	536	436	476
Herrings, . . . . .	25	5	9,312	2,689	.	.	.	.
Ling, . . . . .	1	1	.	.	448	455	226	118
Mackerel, . . . . .	.	.	70	18	.	.	.	.
Plaice, . . . . .	301	231	309	289	1,112	1,526	852	969
Ray or Skate . . . . .	144	44	31	12	489	419	680	268
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	.	.	.	.	929	736	1,027	704
All other except Shell Fish, . . . . .	52	41	35	10	1,361	719	1,432	650
Total, . . . . .	729	460	10,074	3,132	6,680	6,170	6,315	4,891
SHELL FISH:—	No.		No.		No.		No.	
Crabs, . . . . .	640	6	1,920	12	2,880	26	2,724	23
Lobsters, . . . . .	332	11	264	7	1,888	84	3,534	173
Mussels, . . . . .	Cwts.	.	Cwts.	.	Cwts. 373	59	Cwts. 287	25
Oysters, . . . . .	No.	.	No.	.	No. 6,644	21	No. 12,075	44
Other Shell Fish, . . . . .	Cwts.	.	Cwts.	.	Cwts. 385	178	Cwts. 561	168
Total, . . . . .	.	17	.	19	.	368	.	433
Total Value of Fish landed, . . . . .	.	477	.	3,151	.	6,538	.	5,321

NOTE.—The above figures are subject to

## IRELAND.

as landed on the IRISH COASTS during the month of April, 1905, as corresponding period in 1904.

South Coast.				West Coast.				Total.			
1905.		1904.		1905.		1904.		1905.		1904.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
1	6	.	.	.	.	.	.	15	26	20	68
27	129	35	132	481	1,881	300	1,572	542	2,226	361	1,918
4	16	2	7	26	117	23	102	50	241	39	187
32	151	37	139	507	1,998	323	1,674	607	2,493	420	2,173
8	5	125	92	307	110	178	90	1,481	994	1,351	903
.	.	15	8	27	9	4	1	527	275	484	307
1	1	2	4	212	104	141	66	703	533	546	511
.	.	5	5	.	.	26	12	318	536	467	493
1,295	313	5,154	352	93	75	41	11	1,413	393	14,507	3,052
20	8	134	104	517	275	159	52	986	739	519	274
12,558	6,795	18,806	8,874	2,020	1,022	17,651	6,958	14,578	7,817	36,587	15,850
194	180	322	254	210	184	150	144	1,817	2,121	1,633	1,656
.	.	32	4	67	17	20	5	700	480	766	239
.	.	.	.	.	.	.	.	.	.	.	.
14	5	30	14	126	75	279	100	1,069	816	1,336	818
125	77	100	53	278	249	368	136	1,816	1,086	1,935	849
14,247	7,535	21,822	9,903	4,364	4,118	19,340	9,249	28,020	18,283	60,551	27,175
No.		No.		No.		No.		No.		No.	
60	1	.	.	.	.	.	.	3,580	33	4,644	35
185	10	228	15	1,776	80	858	33	4,181	185	4,884	228
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
.	.	.	.	241	18	60	5	614	77	347	30
No.		No.		No.		No.		No.		No.	
6,552	13	.	.	.	.	.	.	13,096	34	12,075	44
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
265	33	109	13	893	160	924	159	1,543	371	1,594	340
.	57	.	28	.	253	.	197	.	700	.	677
.	7,592	.	9,931	.	4,376	.	9,416	.	18,983	.	27,852

correction in the Annual Returns.

## FISHERY STATISTICS—

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as compared with the

	North Coast.				East Coast.			
	1905.		1904.		1905.		1904.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
Brill, . . . . .	.	.	1	3	9	11	32	136
Soles, . . . . .	31	108	15	96	135	757	49	284
Turbot, . . . . .	14	10	1	4	32	216	21	132
Total Prime Fish, . . . .	45	118	17	103	176	984	102	552
Cod, . . . . .	345	110	196	52	760	604	540	516
Conger Eel, . . . . .	1	1	.	.	389	324	595	291
Haddock, . . . . .	492	204	243	104	402	379	381	465
Hake, . . . . .	.	.	.	.	434	678	645	633
Herrings, . . . . .	16,098	14,267	26,635	8,896	3,927	1,242	2,260	1,068
Ling, . . . . .	4	2	.	.	658	542	352	171
Mackerel, . . . . .	279	45	430	49	.	.	.	.
Plaice, . . . . .	506	389	603	705	1,335	1,450	1,022	1,110
Ray or Skate, . . . . .	349	87	182	68	517	306	816	207
Sprats, . . . . .	.	.	.	.	.	.	.	.
Whiting, . . . . .	.	.	.	.	900	714	1,130	725
All other except Shell Fish, .	250	94	181	40	2,420	1,152	1,660	508
Total, . . . . .	18,369	15,317	28,692	10,007	11,918	8,375	9,533	6,247
SHELL FISH:	No.		No.		No.		No.	
Crabs, . . . . .	7,284	26	2,748	20	12,604	116	14,164	81
LoBSTERS, . . . . .	3,619	116	794	24	6,232	263	6,474	274
Mussels, . . . . .	Cwts.	.	Cwts.	.	Cwts.	40	Cwts.	332
OYSTERS, . . . . .	No.	.	No.	.	No.	.	No.	.
Other Shell Fish, . . . . .	Cwts.	20	Cwts.	.	Cwts.	752	Cwts.	516
Total, . . . . .	.	115	.	44	.	560	.	532
Total Value of Fish landed, .	.	15,462	.	10,051	.	8,935	.	6,779

NOTE—The above figures are subject to

## IRELAND.

landed on the IRISH COASTS during the Month of **May**, 1905, as corresponding period in 1904.

South Coast.				West Coast.				Total.			
1905.		1904.		1905.		1904.		1905.		1904.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£	Cwts.	£
5	13	.	.	4	5	17	24	18	29	50	163
43	199	31	126	266	585	362	1,636	476	1,049	467	2,142
5	15	3	12	37	131	33	109	88	372	58	257
53	227	34	138	307	721	412	1,769	581	2,050	565	2,562
453	449	557	335	93	48	544	166	1,651	1,211	1,837	1,069
68	46	109	71	12	4	27	13	470	375	731	375
124	74	96	53	240	103	301	126	1,258	760	1,021	748
5	4	.	.	.	.	12	5	439	682	657	638
18,597	3,528	21,105	5,901	475	203	8,166	2,049	39,097	19,240	58,166	17,914
525	392	617	429	76	33	223	80	1,263	969	1,227	686
97,045	16,541	101,087	17,454	48,667	11,274	46,680	13,131	145,991	27,860	148,197	30,634
222	210	190	177	413	317	206	160	2,506	2,366	2,226	2,152
39	6	118	11	43	12	28	8	948	410	1,174	284
.	.	.	.	.	.	.	.	.	.	.	.
118	29	90	20	301	130	480	174	1,322	873	1,700	920
156	80	172	85	1,032	449	1,082	151	3,858	1,775	3,095	784
117,405	21,585	124,205	24,674	51,692	13,294	58,166	17,838	199,384	58,571	220,596	58,766
No		No.		No.		No.		No.		No.	
834	17	122	1	347	3	271	2	21,049	162	17,305	104
2,416	87	1,280	39	5,527	188	2,524	88	17,794	653	11,062	425
Cwts.	.	Cwts.	.	Cwts.	.	Cwts.	.	Cwts.	40	Cwts.	332
.	.	.	.	.	.	.	.	.	7	.	9
No.	.	No.	.	No.	.	No.	.	No.	.	No.	.
.	.	.	.	.	.	.	.	.	.	.	.
Cwts.		Cwts.		Cwts.		Cwts.		Cwts.		Cwts.	
190	19	190	19	365	149	873	154	1,827	346	1,579	341
.	123	.	59	.	340	.	244	.	1,168	.	879
.	21,708	.	24,733	.	13,634	.	18,082	.	59,739	.	59,645

correction in the Annual Returns.



STATEMENT of the TOTAL QUANTITY of FISH landed on the ENGLISH and WELSH COASTS during the Month and Four Months ended 30th April, 1905, compared with the corresponding Periods of the Year 1904.

	April.		Four Months ended 30th April.	
	1905.	1904.	1905.	1904.
	QUANTITY.			
	Owts.	Owts.	Owts.	Owts.
Brill, .. .. .	2,244	2,086	8,971	8,949
Soles, ... ..	6,333	5,663	22,574	19,664
Turbot, ... ..	5,663	4,790	22,376	21,643
Other Prime Fish, ... ..	—	—	—	—
Total Prime Fish, ..	14,240	12,539	53,921	50,256
Bream, .. .. .	3,480	—	10,192	—
Catfish, ... ..	5,937	4,011	14,141	11,492
Coalfish, ... ..	11,834	—	32,112	—
Cod, ... .. .	157,045	141,266	530,826	522,047
Conger Eels, ... ..	5,018	3,632	18,045	14,955
Dabs, ... .. .	8,390	8,669	33,068	38,923
Dogfish, ... ..	1,303	—	7,651	—
Dory, ... .. .	449	—	1,190	—
Gurnards, ... ..	8,969	6,345	31,881	33,630
Haddock, ... ..	179,427	187,203	651,908	794,265
Hake, ... .. .	24,340	18,188	90,941	79,953
Halibut, ... ..	13,437	9,199	27,181	22,777
Lemon Soles, ... ..	4,356	3,178	13,366	10,909
Ling, ... .. .	22,569	14,288	59,428	56,020
Megrims, ... ..	2,640	2,148	11,652	15,920
Monks (or Anglers), ... ..	3,135	2,634	13,665	14,094
Mullet (Red), ... ..	97	—	540	—
Plaice, ... .. .	84,475	85,582	268,692	243,231
Pollack, ... ..	1,975	—	5,419	—
Skates and Rays, ... ..	29,198	26,241	116,122	120,248
Torsk, ... .. .	717	273	2,526	2,647
Whiting, ... ..	30,272	20,222	115,832	94,461
Witches, ... ..	3,694	2,475	13,113	8,489
Mackerel, ... ..	152,900	62,345	216,790	145,653
Herrings, ... ..	18,736	13,512	27,874	26,481
Pilchards, ... ..	115	—	1,242	4,968
Sprats, ... .. .	16	—	25,237	37,865
Fish, all other, except Shell Fish, ...	26,110	37,439	93,078	163,886
Total, ... .. .	815,022	661,389	2,507,533	12,513,110
Shell Fish:—	No.	No.	No.	No.
Crabs, ... .. .	1,230,705	1,108,670	1,831,328	1,749,837
Lobsters, ... ..	46,436	65,276	101,610	109,924
Oysters, ... .. .	2,500,400	2,532,300	12,394,050	13,001,400
	Owts.	Owts.	Owts.	Owts.
Other Shell Fish, ... ..	25,126	26,018	125,063	116,460

NOTE.—The figures for 1905 are subject to correction in the Annual Returns.  
Bream, Coalfish, Dogfish, Dory, Red Mullet, and Pollack, were not separately distinguished in 1904.

STATEMENT of the TOTAL VALUE of FISH landed on the ENGLISH and WELSH COASTS during the Month and Four Months ended 30th April, 1905, compared with the corresponding Periods of the Year 1904.

	April.		Four Months ended 30th April.	
	1905.	1904.	1905.	1904.
	VALUE.			
	£	£	£	£
Brill, ... ..	6,577	5,769	26,542	24,723
Soles, ... ..	38,742	36,098	151,333	136,536
Turbot, ... ..	23,398	20,095	93,237	88,815
Other Prime Fish, ... ..	—	—	—	—
Total Prime Fish, ...	68,717	61,962	271,112	250,074
Bream, ... ..	1,360	—	4,149	—
Outfish, ... ..	2,467	1,818	6,557	5,122
Coalfish, ... ..	4,502	—	12,221	—
Cod, ... ..	100,458	77,957	355,745	319,870
Conger Eels, ... ..	3,615	2,777	13,991	12,834
Dabs, ... ..	7,268	6,827	29,203	31,960
Dogfish, ... ..	441	—	2,128	—
Dory, ... ..	423	—	1,067	—
Gurnards, ... ..	3,364	2,286	11,224	11,180
Haddock, ... ..	137,282	133,063	530,808	564,296
Hake, ... ..	21,000	14,803	87,500	66,640
Halibut, ... ..	28,564	20,349	71,029	64,486
Lemon Soles, ... ..	10,262	7,430	34,964	31,426
Ling, ... ..	15,525	8,186	43,309	34,399
Megrim, ... ..	2,312	1,769	9,401	11,850
Monks (or Anglers), ... ..	1,243	970	5,848	4,863
Mullet (Red), ... ..	103	—	1,166	—
Plaice, ... ..	71,602	73,344	300,833	249,715
Pollack, ... ..	1,254	—	3,449	—
Skates and Rays, ... ..	18,205	14,148	74,662	71,534
Torsk, ... ..	312	120	1,202	1,210
Whiting, ... ..	15,069	10,748	63,272	46,143
Witches, ... ..	4,011	3,055	15,343	9,949
Mackerel, ... ..	101,980	54,949	152,691	112,506
Herrings, ... ..	4,518	5,610	9,124	11,427
Pilchards, ... ..	27	—	247	1,625
Sprats, ... ..	2	—	3,863	4,127
Fish, all other, except Shell Fish, ...	15,781	22,019	52,728	89,241
Total, ... ..	612,357	524,185	2,168,836	2,006,477
Shell Fish :—				
Crabs, ... ..	10,299	9,118	17,169	15,492
Lobsters, ... ..	2,270	3,218	5,087	5,667
Oysters, ... ..	7,312	6,637	35,570	38,837
Other Shell Fish, ... ..	7,401	8,963	31,521	30,137
Total, ... ..	27,282	27,936	89,347	90,133
Total value of all Fish, ...	669,639	552,121	2,258,183	2,096,610

NOTE.—The figures for 1905 are subject to correction in the Annual Returns.  
Bream, Coalfish, Dogfish, Dory, Red Mullet, and Pollack were not separately distinguished in 1904.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the IRISH COASTS during the Month and Four Months ended 30th April, 1905, compared with the corresponding Periods of the Year 1904.

	April.		Four Months ended 30th April.	
	1905.	1904.	1905.	1904.
QUANTITY.				
	Owts.	Owts.	Owts.	Owts.
Brill, ... ..	15	20	93	77
Soles, ... ..	512	361	1,313	768
Turbot, ... ..	50	39	176	157
Total Prime Fish, ... ..	607	420	1,582	1,002
Cod, ... ..	1,481	1,351	10,123	11,938
Conger Eel, ... ..	627	484	1,900	2,422
Haddock, ... ..	708	546	4,053	5,691
Hake, ... ..	318	467	1,687	2,581
Herrings, ... ..	1,413	14,507	13,267	30,176
Ling, ... ..	986	519	3,451	2,752
Mackerel, ... ..	14,678	36,587	18,289	36,769
Plaice, ... ..	1,817	1,633	6,096	5,007
Ray or Skate, ... ..	700	766	2,686	3,155
Sprats, ... ..	—	—	49	18
Whiting, ... ..	1,069	1,336	4,872	9,746
Fish not separately distinguished, except shell fish.	1,816	1,935	6,590	9,477
Total, ... ..	26,020	60,551	74,645	120,734
Shell Fish :—	No.	No.	No.	No.
Crabs, ... ..	3,580	4,844	4,600	5,423
Lobsters, ... ..	4,181	4,884	9,887	12,032
Oysters, ... ..	13,096	1,594	188,804	187,144
Mussels, ... ..	Cwts.	Cwts.	Cwts.	Cwts.
Other Shell Fish, ... ..	614	347	3,862	2,423
	1,543	1,594	6,933	5,769
VALUE.				
	£	£	£	£
Brill, ... ..	26	68	116	288
Soles, ... ..	2,228	1,918	6,087	3,958
Turbot, ... ..	241	167	942	885
Total Prime Fish, ... ..	2,493	2,173	7,175	5,131
Cod, ... ..	991	903	6,660	7,715
Conger Eel, ... ..	276	307	982	1,468
Haddock, ... ..	533	511	3,023	4,163
Hake, ... ..	536	493	2,774	2,690
Herrings, ... ..	393	3,052	3,707	7,697
Ling, ... ..	739	274	2,888	1,217
Mackerel, ... ..	7,817	15,850	9,331	15,937
Plaice, ... ..	2,121	1,656	6,662	4,916
Ray or Skate, ... ..	480	289	1,833	1,120
Sprats, ... ..	—	—	13	3
Whiting, ... ..	816	818	3,554	5,354
Fish not separately distinguished, except shell fish.	1,086	849	3,945	4,515
Total, ... ..	18,283	27,175	52,547	61,916
Shell Fish :—				
Crabs, ... ..	33	35	38	51
Lobsters, ... ..	185	228	447	532
Oysters, ... ..	34	44	359	315
Mussels, ... ..	77	30	402	235
Other Shell Fish, ... ..	371	340	1,458	1,163
Total, ... ..	700	677	2,704	2,296
Total Value of Fish Landed, ... ..	13,983	27,852	55,251	64,212

NOTE.—The figures for 1905 are subject to correction in the Annual Returns.

STATEMENT of the TOTAL QUANTITY and VALUE of the FISH returned as landed on the SCOTTISH COASTS during the Month and Four Months ended 30th April, 1905, compared with the corresponding periods of the Year 1904.

	April.		Four Months ended 30th April.	
	1905.	1904.	1905.	1904.
QUANTITY.				
	Cwts.	Cwts.	Cwts.	Cwts.
Sparling, ... ..	4	3	80	70
Turbot, ... ..	325	473	1,665	1,986
Cod, ... ..	69,047	53,398	227,308	214,196
Conger Eel, ... ..	1,380	258	11,363	10,201
Flounders, Plaice, Brill, ... ..	6,639	6,665	23,586	27,680
Haddock, ... ..	66,803	60,134	292,114	299,719
Hallbut, ... ..	3,922	2,984	8,083	7,893
Herrings, ... ..	7,657	8,944	486,645	515,765
Lemon Soles, ... ..	1,852	2,081	6,210	6,075
Ling, ... ..	18,231	11,117	50,856	46,366
Mackerel, ... ..	8	63	128	562
Saith (Coal Fish), ... ..	8,381	4,971	31,275	25,044
Skate and Rays, ... ..	11,696	8,031	38,624	42,696
Sprats, ... ..	70	430	1,347	20,849
Torsk (Tusk), ... ..	1,641	1,122	3,590	3,672
Whiting, ... ..	19,839	13,787	71,931	53,541
Fish not separately distinguished, except Shell Fish, ... ..	7,747	8,768	28,914	32,374
Total, ... ..	224,645	183,239	1,283,719	1,308,593
Shell Fish:—	No.	No.	No.	No.
Crabs, ... ..	320,362	336,064	413,273	610,128
Lobsters, ... ..	47,808	33,358	305,275	145,797
Oysters, ... ..	20,815	48,680	107,055	141,139
	Cwts.	Cwts.	Cwts.	Cwts.
Clams, ... ..	1,555	599	3,980	3,474
Mussels, ... ..	5,858	5,682	31,546	31,990
Other Shell Fish, ... ..	5,682	6,423	22,916	22,553
VALUE.				
	£	£	£	£
Sparling, ... ..	20	15	244	257
Turbot, ... ..	1,307	1,708	6,538	7,813
Cod, ... ..	29,332	23,353	106,608	98,069
Conger Eel, ... ..	555	113	5,316	5,056
Flounders, Plaice, Brill, ... ..	6,148	7,873	28,401	33,700
Haddock, ... ..	44,504	41,813	191,116	190,689
Hallbut, ... ..	7,329	5,274	16,190	16,859
Herrings, ... ..	1,969	2,354	105,906	126,035
Lemon Soles, ... ..	4,068	4,424	13,890	14,926
Ling, ... ..	6,125	3,926	18,749	17,466
Mackerel, ... ..	6	31	69	288
Saith (Coal Fish), ... ..	1,643	1,124	6,743	5,688
Skate and Rays, ... ..	3,307	2,230	12,522	13,397
Sprats, ... ..	6	86	222	1,004
Torsk (Tusk), ... ..	457	254	1,042	954
Whiting, ... ..	8,647	5,711	29,806	20,501
Fish not separately distinguished, except Shell Fish, ... ..	4,604	5,776	20,263	23,627
Total, ... ..	119,927	106,065	563,625	575,819
Shell Fish:				
Crabs, ... ..	1,839	2,313	3,319	3,942
Lobsters, ... ..	2,774	1,972	8,554	9,200
Oysters, ... ..	107	163	429	528
Clams, ... ..	243	72	576	486
Mussels, ... ..	403	371	2,020	1,945
Other Shell Fish, ... ..	1,365	1,787	6,241	5,987
Total, ... ..	6,731	6,668	20,139	22,088
Total Value of Fish landed, ... ..	126,658	112,733	583,764	597,907

NOTE.—The above figures are subject to correction in the Annual Returns.

RETURN of AVERAGE PRICES for each PROVINCE and for the WHOLE OF IRELAND of CROPS, CATTLE, SHEEP, and other AGRICULTURAL PRODUCE for the QUARTER ended 31st MARCH, 1905, and for the WHOLE OF IRELAND for the corresponding QUARTER of 1904.

PRODUCT.	PROVINCE.				Whole of Ireland, 1905.	Whole of Ireland 1904.
	Leinster.	Munster.	Ulster.	Con-naught.		
CROPS :—	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Wheat, per 112 lbs.	—	6 0½	—	—	6 0½	6 9½
White Oats, . . .	—	6 11½	5 7½	6 7	5 10½	5 11½
Black Oats, . . .	5 11½	5 7½	—	—	5 8½	5 3
Barley, . . .	—	—	—	—	—	5 8
Potatoes, . . .	2 11	3 5½	2 6	3 10	2 11½	3 8½
Hay, . . .	3 9½	2 6	3 1½	2 0½	2 10½	3 1½
Perennial Rye Grass Seed, per 112 lbs.	—	—	8 5½	—	8 5½	12 3½
Italian Rye Grass Seed, . . .	—	—	7 11½	—	7 11½	—
Flax, . . . per 14 lbs.	—	—	6 7½	—	6 7½	6 6½
STORE CATTLE :—	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
One year old, per head,	7 1 7	8 3 2	5 17 4	6 19 5	7 5 11	7 6 4
Two years old, . . .	10 1 4	10 15 5	8 9 9	9 12 6	9 19 11	9 19 5
Three years old, . . .	12 10 5	13 12 2	11 10 0	12 9 11	12 12 5	12 8 0
Springers . . .	14 14 3	13 7 1	12 12 1	13 8 6	13 5 4	13 2 11
STORE SHEEP :—						
Lambs, . . . per head,	1 4 3	1 15 4	—	1 8 10	1 13 4	1 12 5
Over 12 & under 2½ months old, . . .	2 0 3	2 2 5	—	2 0 10	2 1 4	1 15 6
Two years old and upwards, . . .	2 8 1	—	—	2 0 5	2 3 1	2 4 5
MISCELLANEOUS PRODUCE :	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
BUTTER, . . . per 112 lbs.	93 11	101 6½	112 6½	81 8½	101 1½	104 4
EGGS, . . . per 120,	8 3½	8 0½	—	7 2½	7 8½	8 1½
PORK, . . . per 112 lbs.	—	46 6	45 3½	45 11½	46 4½	39 11½
BEEF, . . .	—	—	—	—	55 0½	53 9½
MUTTON, . . .	—	—	—	—	69 7½	69 2½
WOOL, . . . per lb.	—	0 11	—	—	0 11	—

**STATEMENT showing the AVERAGE PRICES of WHEAT, OATS, and BARLEY**  
per 112 lbs., computed from Market Returns of certain quantities of these Cereals supplied to the Department of Agriculture and Technical Instruction for Ireland by Inland Revenue Officers, for each Week of the **QUARTER** ended 31st MARCH, 1905.

Returns received in the Week ended	WHEAT.		OATS.		BARLEY.	
	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.	Average Price per 112 lbs.	Quantity.
	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.	s. d.	Cwts. of 112 lbs.
January 7.	—	—	5 8½	5,814½	—	—
" 14.	—	—	5 9	6,637½	—	—
" 1.	—	—	5 9½	6,755½	—	—
" 28.	6 0	22½	5 8	8,034½	—	—
February 4.	—	—	5 10	5,856½	—	—
" 11.	6 4	5	6 0	6,603½	—	—
" 18.	—	—	5 8	5,049½	—	—
" 25.	—	—	5 10½	4,036	—	—
March 4.	—	—	5 9½	4,032½	—	—
" 11.	—	—	5 9½	3,952½	—	—
" 18.	—	—	6 0	5,200½	—	—
" 25.	—	—	6 2½	3,529½	—	—

**TABLE showing the AVERAGE PRICE per 112 lbs., LIVE WEIGHT, of FAT CATTLE and FAT SHEEP sold in the DUBLIN MARKET during the QUARTER ended 31st MARCH, 1905, and also for the corresponding period during the eight preceding years.**

DESCRIPTION.	YEAR.								
	1905.	1904.	1903.	1902.	1901.	1900.	1899.	1898.	1897.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Fat Cattle.	31 5½	30 8½	33 10	32 6½	32 4½	33 2	31 8	29 9½	31 4½
Fat Sheep.	39 9½	39 6½	41 0½	34 7½	26 9½	37 5	34 1½	26 9½	26 11½

STATEMENT showing the NUMBERS of CATTLE and SHEEP in respect of which "LIVE WEIGHT" Returns have been furnished to the Department of Agriculture and Technical Instruction for Ireland, as under, during the Quarter ended 31st March, 1905.

WEEK ENDED	Numbers included in Returns of Live Weight of Fat Cattle furnished by			Numbers included in Returns of Live Weight of Store Cattle furnished by Official Reporters of Prices.	Total Number of Cattle included in Returns.	Numbers included in Returns of Live Weight of Fat Sheep furnished by		Total Number of Sheep included in Returns.
	Dublin Corporation Market Authorities.	Mr. Gavin Low (Dublin).	Mr. John Robson (Belfast).			Dublin Corporation Market Authorities.	Mr. Gavin Low (Dublin).	
January 7. . . . .	69	114	22	—	205	—	143	143
" 14. . . . .	61	163	25	41	293	27	273	300
" 21. . . . .	48	184	23	—	255	15	271	286
" 28. . . . .	60	163	29	—	252	35	215	250
February 4. . . . .	65	113	32	—	210	48	244	292
" 11. . . . .	68	82	48	—	198	31	186	217
" 18. . . . .	70	135	29	—	234	54	273	327
" 25. . . . .	45	166	27	—	238	57	190	247
March 4. . . . .	47	84	42	—	173	52	190	242
" 11. . . . .	49	141	32	50	272	54	208	262
" 18. . . . .	70	56	38	—	164	50	149	199
" 25. . . . .	70	116	46	—	232	64	276	340
Totals. . . . .	722	1,517	393	91	2,726	487	2,618	3,106

## CREAMERY BUTTER PRICE STATISTICS.

Week ending	Copenhagen Top Quotations.		Manchester.				Lb. Rolls. In 24-lb. case. Per Cwt.	
	Kroner per 50 Kilos.	Shil- lings per cwt. ap- prox- imately.	Danish and Swedish Choice.	Irish Creameries Choice.	Danish. Free on rail, London.	Irish. Carriage paid, Passen- ger Train.		
<i>All landed.</i>							<i>Cash with Order.</i>	
	Kr.	s. d.	s. s.	s. s.	s. s.	s. d.	s. d.	
March, . . . 25,	96	107 10	110 to 114	—	—	119 0	117 10	
April, . . . 1,	94	105 7	111 to 115	—	—	116 8	115 6	
" . . . 8,	90	101 1	108 to 112	106 to 108	—	112 0	110 10	
" . . . 15,	90	101 1	105 to 109	101 to 106	—	112 0	110 10	
" . . . 22,	10	101 1	107 to 111	102 to 105	—	112 0	110 10	
" . . . 29,	86	96 7	105 to 110	100 to 104	—	107 4	106 2	
May, . . . 6,	84	94 4	100 to 105	94 to 96	—	105 0	103 10	
" . . . 13,	84	94 4	99 to 103	90 to 96	—	105 0	103 10	
" . . . 20,	84	94 4	100 to 105	94 to 97	—	105 0	103 10	
" . . . 27,	84	94 4	103 to 106	96 to 98	—	105 0	103 10	
June, . . . 3,	84	94 4	103 to 104	96 to 98	—	105 0	103 10	
" . . . 10,	84	94 4	101 to 105	95 to 97	—	105 0	103 10	
" . . . 17,	83	96 7	101 to 105	94 to 98	—	108 6	106 2	

From Manchester prices, from 8s. to 10s. must be deducted in order to arrive at the net return to a Danish Creamery; and from 5s. to 7s. to get net return to an Irish Creamery.

Danish pound rolls are free on rail, London, wrapped in parchment and in cardboard boxes.

Irish pound rolls are carriage paid per passenger train, wrapped in parchment and in cardboard boxes.

If rolls are not packed in cardboard boxes, deduct  $\frac{1}{2}d.$  per lb. = 1s. 2d. per cwt.

An extra charge of  $\frac{1}{2}d.$  per lb. is made where cash does not arrive with order.

Carriage on pound rolls per passenger train is  $\frac{1}{2}d.$  per lb., excluding box; allowing for weight of box, carriage works out at 5s. 2d. to 5s. 8d. per cwt. of butter.



## TABLES SHOWING THE EXPORTS

## TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT  
PORTS of EMBARKATION

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ballina, . .	71	.	71	.	142	1	.	1	76	.	76
Belfast, . .	2,509	20,092	12	109	22,722	790	.	790	2,959	319	3,278
Coleraine, . .	10	.	.	.	10	.	.	.	.	.	.
Cork, . . .	1,450	7,440	586	4,631	14,107	5,457	15	5,472	9,692	.	9,692
Drogheda, . .	4,500	623	.	1	5,121	1,712	.	1,712	2,145	50	2,195
Dublin, . .	27,838	31,255	679	2,654	62,426	27,669	31	27,700	73,647	.	73,647
Dundalk, . .	2,963	2,416	.	.	5,379	151	.	151	4,097	520	4,617
Dundrum (Co. Down), . .	.	33	.	.	33	.	.	.	.	.	.
Greenore, . .	262	2,044	.	.	2,306	115	.	115	456	10	466
Larne, . . .	670	4,230	.	.	4,900	10	.	10	39	29	68
Limerick, . .	279	163	.	61	503	.	.	.	.	.	.
Londonderry, . .	3,438	9,137	111	2,922	15,608	374	.	374	1,738	41	1,779
Newry, . . .	160	74	.	.	234	242	.	242	497	.	497
Portrush, . .	37	135	.	.	172	16	.	16	162	.	162
Sligo, . . .	35	342	.	.	377	140	.	140	9,415	.	9,415
Waterford, . .	5,615	6,003	126	493	12,237	3,183	2	3,185	13,980	15	13,995
Westport, . .	95	12	34	.	141	813	.	813	2,126	.	2,126
Wexford, . .	1,641	399	.	.	2,043	657	.	657	4,709	.	4,709
Total, . . .	51,576	84,398	1,619	10,871	148,164	41,363	48	41,411	125,738	984	126,722

## AND IMPORTS OF ANIMALS.

## I.

BRITAIN during the Three Months ended 31st MARCH, 1905, showing the  
in Ireland.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	.	.	.	.	.	219	Ballina.
.	9	653	1,005	1,567	.	2	28,359	Belfast.
.	.	.	.	.	.	.	10	Coleraine.
.	1	122	242	365	.	33	29,669	Cork.
9	.	16	13	29	.	104	9,173	Drogheda
15	17	983	780	1,760	2	21	165,591	Dublin.
19	.	122	116	238	.	23	10,430	Dundalk.
.	.	.	.	.	.	.	33	Dundrum (Co. Down).
98	1	444	279	724	.	17	3,756	Greenore.
.	3	33	26	62	.	1	5,041	Larne.
.	.	.	.	.	.	.	503	Limerick.
.	.	37	68	105	.	.	17,866	Londonderry.
.	.	2	2	4	.	9	986	Nowry.
.	.	.	2	2	.	.	352	Portrush.
.	.	1	2	3	.	.	9,935	Sligo.
.	.	343	348	691	.	.	30,108	Waterford
.	.	4	1	5	.	3	3,088	Westport.
.	.	1	4	5	.	.	7,414	Wexford.
141	31	2,661	2,888	5,580	2	213	322,533	Total.

TABLE

RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to GREAT  
PORTS of DEBARKATION

BRITISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ardrossan, .	197	3,804	12	.	4,013	.	.	.	194	367	561
Ayr, . . .	301	6,284	.	51	6,616	26	.	26	232	322	554
Barrow, . .	522	3,400	.	.	3,922	22	.	22	2,380	.	2,380
Bristol, . .	2,134	3,145	.	1,184	6,463	2,107	.	2,107	13,029	.	13,029
Fleetwood	1,645	2,626	.	.	4,271	413	.	413	235	.	235
Glasgow, . .	4,054	15,763	1,151	5,466	26,424	102	.	102	11,685	.	11,685
Greenock, . .	153	1,607	2	18	1,780	2	.	2	141	41	182
Heysham, . .	854	7,689	.	.	8,543	60	.	60	10,472	.	10,472
Holyhead, . .	6,014	11,763	.	157	17,934	6,298	12	6,310	41,218	10	41,228
Liverpool, . .	23,482	17,001	454	836	41,793	22,199	20	22,219	35,614	254	35,868
London, . . .	.	1	.	.	1	.	.	.	.	.	.
Manchester, . .	5,212	1,840	.	.	7,052	4,439	.	4,439	1,608	.	1,608
Milford, . . .	3,781	4,788	.	3,027	11,596	5,075	16	5,091	8,684	.	8,684
Newhaven, . .	.	35	.	.	35	.	.	.	.	.	.
Plymouth, . .	358	96	.	.	454	.	.	.	.	.	.
Portsmouth, . .	.	.	.	.	.	.	.	.	.	.	.
Silloth, . . .	2,107	402	.	.	2,509	.	.	.	.	.	.
Southampton, . .	92	34	.	122	248	20	.	20	246	.	246
Stranraer, . .	670	3,956	.	.	4,626	.	.	.	.	.	.
Whitehaven, . .	.	184	.	.	184	.	.	.	.	.	.
Total, . . .	51,576	84,398	1,619	10,571	148,464	41,363	48	41,411	125,738	984	126,722

## II.

BRITAIN during the Three Months ended 31st MARCH, 1905, showing the in Great Britain.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	BRITISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	75	161	236	.	.	4,800	Ardrossan.
.	.	20	28	54	.	.	7,250	Ayr.
.	.	12	57	69	.	.	6,393	Barrow.
.	.	91	132	276	.	2	21,877	Bristol.
.	3	217	337	557	.	1	5,477	Fleetwood.
.	1	104	198	303	.	.	38,514	Glasgow.
.	.	1	5	6	.	.	1,970	Greenock.
.	6	66	113	185	.	1	19,261	Heysham.
100	16	1,314	950	2,280	1	24	67,877	Holyhead.
30	2	305	393	700	.	170	100,789	Liverpool.
.	.	1	.	1	.	.	2	London.
2	.	37	25	62	1	3	13,167	Manchester.
.	.	350	370	720	.	11	26,702	Milford.
.	.	.	.	.	.	.	35	Newhaven.
.	.	4	11	15	.	.	469	Plymouth.
.	.	.	1	1	.	.	1	Portsmouth.
.	.	9	4	13	.	.	2,522	Silloth.
.	.	8	17	25	.	.	539	Southampton.
.	3	33	26	62	.	1	4,689	Straanraer.
.	.	5	10	15	.	.	199	Whitehaven.
141	31	2,661	2,888	5,560	2	213	322,533	Total.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT  
of DEBARKATION

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ballina, .	.	.	.	.	.	.	.	.	.	.	.
Belfast, . .	.	43	.	.	43	2,429	.	2,429	.	1	1
Coleraine, .	.	.	.	.	.	.	.	.	.	.	.
Cork, . .	.	17	.	.	17	.	.	.	.	.	.
Drogheda, .	.	.	.	.	.	.	.	.	.	.	.
Dublin, . .	.	79	.	.	79	363	.	363	.	1	1
Dundalk, .	.	.	.	.	.	.	.	.	.	.	.
Dundrum, .	.	.	.	.	.	.	.	.	.	.	.
Greenore, .	.	4	.	.	4	.	.	.	.	.	.
Larne, . .	.	44	.	.	44	.	.	.	.	.	.
Limerick, .	.	.	.	.	.	.	.	.	.	.	.
Londonderry .	.	15	.	.	15	.	.	.	.	.	.
Newry, . .	.	.	.	.	.	.	.	.	.	.	.
Portrush, . .	.	3	.	.	3	.	.	.	.	.	.
Sligo, . .	.	1	.	.	1	.	.	.	.	.	.
Waterford, .	.	12	.	.	12	.	.	.	.	.	.
Westport, .	.	1	.	.	1	.	.	.	.	.	.
Wexford, .	.	.	.	.	.	.	.	.	.	.	.
Total, .	.	219	.	.	219	2,792	.	2,792	.	9	9

111.

BRITAIN during the Three Months ended 31st MARCH, 1905, showing the PORTS in Ireland.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	.	.	.	.	.	.	Ballina.
.	7	78	205	290	.	1	2,764	Belfast.
.	.	.	.	.	.	.	.	Coleraine.
.	5	10	25	40	.	.	57	Cork.
.	.	2	3	5	.	48	53	Drogheda.
2	10	244	195	449	1	1	896	Dublin.
.	1	5	13	19	.	.	19	Dundalk.
.	.	.	.	.	.	.	.	Dundrum.
.	3	7	11	21	.	.	25	Greenore.
.	2	6	8	16	.	.	60	Larne.
.	.	.	.	.	.	.	.	Limerick.
.	1	8	7	16	.	.	31	Londonderry.
.	.	2	8	10	.	.	10	Newry.
.	.	.	.	.	.	.	3	Portrush.
.	.	.	2	2	.	.	3	Sligo.
.	1	21	28	50	.	.	62	Waterford.
.	.	.	.	.	.	.	1	Westport.
.	.	3	8	11	.	.	11	Wexford.
2	30	336	513	929	1	60	3,995	Total.

TABLE

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from GREAT BRITAIN  
EMBARKATION in

BRITISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Ardrossan, .	.	39	.	.	39	1,468	.	1,468	.	.	.
Ayr, . .	.	.	.	.	.	961	.	961	.	.	.
Barrow, . .	.	.	.	.	.	.	.	.	.	.	.
Bristol, . .	.	.	.	.	.	.	.	.	.	.	.
Falmouth, .	.	.	.	.	.	.	.	.	.	.	.
Fleetwood, .	.	.	.	.	.	.	.	.	.	1	1
Glasgow, . .	.	85	.	.	85	363	.	363	.	.	.
Greenock, . .	.	2	.	.	2	.	.	.	.	.	.
Heysham, . .	.	.	.	.	.	.	.	.	.	.	.
Holyhead, . .	.	6	.	.	6	.	.	.	.	1	1
Liverpool, . .	.	27	.	.	27	.	.	.	.	.	.
London, . . .	.	1	.	.	1	.	.	.	.	.	.
Manchester, .	.	.	.	.	.	.	.	.	.	.	.
Milford, . . .	.	.	.	.	.	.	.	.	.	.	.
Newhaven, . .	.	.	.	.	.	.	.	.	.	.	.
Plymouth, . .	.	.	.	.	.	.	.	.	.	.	.
Silloth, . . .	.	14	.	.	14	.	.	.	.	.	.
Southampton, .	.	1	.	.	1	.	.	.	.	.	.
Stranraer, . .	.	44	.	.	44	.	.	.	.	.	.
Whitehaven, .	.	.	.	.	.	.	.	.	.	.	.
Total, . . .	.	219	.	.	219	2,792	.	2,792	.	2	2

## IV

during the Three Months ended 31st MARCH, 1905, showing the Ports of Great Britain.

Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	BRITISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	9	36	45	.	.	1,562	Ardrossan.
.	.	12	22	34	.	.	995	Ayr.
.	.	.	.	.	.	.	.	Barrow.
.	1	14	22	37	.	.	37	Bristol.
.	.	1	.	1	.	.	1	Falmouth.
.	2	26	71	99	.	.	100	Fleetwood.
.	2	30	51	83	.	.	531	Glasgow.
.	3	4	.	7	.	.	9	Greenock.
.	3	16	30	49	.	1	50	Heysham.
2	8	207	164	379	.	.	388	Holyhead.
.	4	35	67	106	.	48	181	Liverpool.
.	.	1	1	2	.	.	3	London.
.	.	.	1	1	.	.	1	Manchester.
.	5	16	29	50	.	.	50	Milford.
.	.	2	3	5	.	.	5	Newhaven.
.	.	2	4	6	1	.	7	Plymouth.
.	.	5	2	7	.	1	22	Silloth.
.	.	.	2	2	.	.	3	Southampton.
.	2	6	8	16	.	.	60	Stranraer.
.	.	.	.	.	.	.	.	Whitehaven.
2	30	386	513	929	1	50	3,995	Total.



RETURN of the NUMBER of ANIMALS EXPORTED from IRELAND to the  
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs.	Total.
BELFAST, . . . . .	4	11	.	7	22	21	.	21
DUBLIN, . . . . .	.	.	.	.	.	.	.	.
TOTAL, . . . . .	4	11	.	7	22	21	.	21

RETURN of NUMBER of ANIMALS EXPORTED from IRELAND to the  
showing the PORTS of DEBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs.	Total.
DOUGLAS, . . . . .	4	11	.	7	22	21	.	21

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the  
showing the PORTS of

IRISH PORTS.	CATTLE.					SHEEP.		
	Fat.	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs.	Total.
BELFAST, . . . . .	.	.	.	.	.	.	.	.
DUBLIN, . . . . .	.	.	.	.	.	.	.	.
TOTAL, . . . . .	.	.	.	.	.	.	.	.

RETURN of the NUMBER of ANIMALS IMPORTED into IRELAND from the  
showing the PORTS of EMBARKATION

ISLE OF MAN PORT.	CATTLE.					SHEEP.		
	Fat	Stores.	Other Cattle.	Calves	Total.	Sheep.	Lambs	Total.
DOUGLAS, . . . . .	.	.	.	.	.	.	.	.

ISLE OF MAN during the Three Months ended 31st MARCH, 1905,  
EMBARKATION in IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	.	.	.	.	.	43	BELFAST.
.	.	.	.	.	.	.	.	.	.	.	DUBLIN.
.	.	.	.	.	.	.	.	.	.	43	TOTAL.

ISLE OF MAN during the Three Months ended 31st MARCH, 1905,  
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	.	.	.	.	.	43	DOUGLAS.

ISLE OF MAN during the Three Months ended 31st MARCH, 1905,  
DEBARKATION in IRELAND.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	IRISH PORTS.
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	.	1	1	.	.	1	BELFAST.
.	.	.	.	.	.	.	.	.	.	.	DUBLIN.
.	.	.	.	.	.	1	1	.	.	1	TOTAL.

ISLE OF MAN during the Three Months ended 31st MARCH, 1905,  
in the ISLE OF MAN.

SWINE.			Goats.	HORSES.				Mules or Jennets.	Asses.	Total Animals.	ISLE OF MAN PORT
Fat.	Stores.	Total.		Stal- lions.	Mares.	Geld- ings.	Total.				
.	.	.	.	.	.	1	1	.	.	1	DOUGLAS.

## COASTING AND

RETURN of the NUMBER of ANIMALS SHIPPED to and from Places in Ireland  
of Embarkation

IRISH PORTS.	CATTLE.					SHEEP.			SWINE.		
	Fat.	Stores.	Other Cattle.	Calves.	Total.	Sheep.	Lambs.	Total.	Fat.	Stores.	Total.
Cork to Aghada Pier, .	.	.	.	10	10	.	.	.	.	.	.
" to Belfast, .	.	1	.	.	1	.	.	.	.	.	.
" to Spike Island, .	.	.	.	.	.	.	.	.	.	5	5
" to Queenstown, .	.	.	.	.	.	4	.	4	.	.	.
" to Waterford, .	.	.	.	6	6	.	.	.	.	.	.
Total, .	.	1	.	16	17	4	.	4	.	5	5
Aghada Pier to Cork, .	.	.	.	.	.	37	.	37	252	.	252
Belfast " .	.	.	.	.	.	.	.	.	.	.	.
Dingle " .	.	.	.	.	.	55	.	55	.	.	.
Spike Island " .	.	.	.	.	.	.	.	.	4	.	4
Queenstown " .	.	.	.	.	.	.	.	.	26	.	26
Waterford " .	.	1	.	18	19	.	.	.	.	.	.
Total, .	.	1	.	18	19	92	.	92	282	.	282
Waterford to Belfast, .	.	.	.	.	.	.	.	.	.	.	.
" to Duncannon, .	.	141	.	131	272	.	.	.	1	8	9
" to New Ross, .	.	144	.	133	282	.	.	.	.	.	.
Total, .	.	285	.	269	554	.	.	.	1	8	9
Belfast to Waterford, .	.	.	.	.	.	.	.	.	.	.	.
Duncannon to Waterford, .	419	89	.	.	608	73	1	74	1,803	.	1,803
New Ross to Waterford, .	614	294	.	4	912	1,095	.	1,095	1,781	.	1,781
Kilrush to Limerick, .	48	70	3	15	136	.	.	.	1,333	.	1,333
Kildysart " .	5	.	.	.	5	.	.	.	203	.	203
Glin " .	.	.	.	.	.	5	.	5	37	.	37
Portumna " .	.	.	.	.	.	.	.	.	170	.	170
Scariff " .	.	.	.	.	.	.	.	.	28	.	28
Tarbert " .	.	.	.	.	.	.	.	.	66	.	66
Total, .	53	70	3	15	141	5	.	5	1,897	.	1,897
Greencastle to Greenore, .	.	124	.	.	124	.	.	.	18	.	18
Londonderry to Moville, .	3	7	.	.	10	.	.	.	.	.	.
Moville to Londonderry, .	30	36	.	2	68	.	.	.	36	.	35
Belmullet to Sligo, .	.	15	.	.	15	.	.	.	1,063	.	1,063
Total, .	1,119	922	3	34	2,368	1,269	1	1,270	6,570	13	6,583

## INLAND NAVIGATION.

during the Three Months ended 31st March, 1905, showing the Places and Debarkation.

Goats.	HORSES.				Mules or Jernets.	Asses.	Total Animals.	IRISH PORTS.
	Stallions.	Mares.	Geldings.	Total.				
.	.	.	.	.	.	.	10	Cork to Aghada Pier,
.	.	1	1	2	.	.	3	" to Belfast.
.	.	.	.	.	.	.	5	" to Spike Island.
.	.	.	.	.	.	.	4	" to Queenstown.
.	.	.	.	.	.	.	6	" to Waterford.
.	.	1	1	2	.	.	28	Total.
.	.	.	.	.	.	.	289	Aghada Pier to Cork.
.	.	.	1	1	.	.	1	Belfast "
.	.	.	.	.	.	.	55	Dingle "
.	.	.	.	.	.	.	4	Spike Island "
.	.	.	.	.	.	.	26	Queenstown "
.	.	.	.	.	.	.	19	Waterford "
.	.	.	1	1	.	.	391	Total.
.	.	1	1	2	.	.	2	Waterford to Belfast.
.	.	1	3	4	.	2	287	" to Duncannon.
.	.	.	1	1	.	.	283	" to New Ross.
.	.	2	5	7	.	2	572	Total.
.	.	3	.	3	.	.	3	Belfast to Waterford.
.	.	.	.	.	.	.	2,385	Duncannon to Waterford.
.	.	.	.	.	.	.	3,788	New Ross to Waterford.
.	.	.	.	.	.	1	1,470	Kilrush to Limerick.
.	.	.	.	.	.	.	268	Kildysart "
.	.	.	.	.	.	.	42	Glin "
.	.	.	.	.	.	.	170	Portumna "
.	.	.	.	.	.	.	28	Scuriff "
.	.	.	.	.	.	.	66	Tarbert "
.	.	.	.	.	.	1	2,044	Total.
.	.	.	.	.	.	.	142	Greencastle to Greenore.
.	.	.	.	.	.	.	10	Londonderry to Moville.
.	.	1	1	2	.	.	105	Moville to Londonderry.
.	.	.	.	.	.	.	1,068	Belmullet to Sligo.
.	.	7	8	15	.	3	10,539	Total.

RETURN of the NUMBER of HORSES EXPORTED from IRELAND through GREAT BRITAIN to the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31st MARCH, 1905, showing the Ports of Embarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast, . . . . .	—	81	53	134
Dublin, . . . . .	1	31	29	61
Greenore, . . . . .	—	171	82	253
Waterford, . . . . .	—	3	6	9
Total, . . . . .	1	286	170	457

RETURN of the NUMBER of HORSES IMPORTED into IRELAND through GREAT BRITAIN from the COLONIES and FOREIGN COUNTRIES during the THREE MONTHS ended 31st MARCH, 1905, showing the Ports of Debarkation in Ireland.

PORTS.	Number of Horses.			
	Stallions.	Mares.	Geldings.	Total.
Belfast, . . . . .	—	10	21	31
Dublin, . . . . .	—	1	—	1
Total, . . . . .	—	11	21	32

## DISEASES OF ANIMALS IN IRELAND.

NUMBER of OUTBREAKS of SWINE-FEVER, and Number of SWINE returned as having been SLAUGHTERED in Ireland, under the Diseases of Animals Act of 1894, in the undermentioned period, by Order of the Department.

Quarter ended	SWINE-FEVER.	
	Outbreaks confirmed.	Swine Slaughtered as Diseased or as having been Exposed to Infection.
March, 1905.	5	196

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by ANTHRAX and GLANDERS in Ireland in the undermentioned period.

Quarter ended	ANTHRAX.		GLANDERS (including Farcy)		Epizootic Lymphangitis	
	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.	Outbreaks Reported.	Animals Attacked.
March, 1905.	1	1	9	23	2	14

NUMBER of Cases of RABIES in DOGS in IRELAND during the undermentioned period.

Quarter ended	Number of Cases.
March, 1905.	Nil.

NUMBER of OUTBREAKS reported as having taken place, and NUMBER of ANIMALS returned as having been attacked by SHEEP-SCAB and PARASITIC-MANGE in Ireland in the undermentioned period.

Quarter ended	SHEEP-SCAB.		PARASITIC-MANGE.	
	Outbreaks Reported.	Sheep Attacked.	Outbreaks Reported.	Animals Attacked.
March, 1905.	178	2,428	60	136

Veterinary Branch,  
Department of Agriculture and Technical Instruction for Ireland,  
Dublin.

ACCOUNT showing the QUANTITIES of certain kinds of AGRICULTURAL  
into Ireland in each WEEK from

ARTICLES.	WEEK ENDED				
	4th March.	11th March.	18th March.	25th March.	1st April.
ANIMALS, LIVING—					
Horses, . . . . .	.	.	.	.	.
FRESH MEAT—					
Beef, . . . . . cwt.	.	.	.	.	.
Mutton, . . . . . "	.	.	.	.	.
SALTED OR PRESERVED MEAT—					
Bacon, . . . . . cwt.	.	.	131	.	.
Beef, . . . . . "	.	.	.	.	.
Hams, . . . . . "	.	.	34	.	.
Pork, . . . . . "	160	.	.	.	.
Meat, unenumerated, Salted or Fresh, . . . . .	.	.	188	.	.
Meat preserved otherwise than by salting, . . . . . cwt.	.	1,400	339	1,344	22
DAIRY PRODUCE AND SUBSTITUTES—					
Butter, . . . . . cwt.	.	.	.	5	.
Margarine, . . . . . "	226	200	127	169	199
Cheese, . . . . . "	.	3	.	.	.
Milk, Condensed, . . . . . "	161	35	69	79	42
" Cream, . . . . . "	.	.	.	.	.
" Preserved, other kinds "	.	.	.	.	.
EGGS, . . . . . gl. hunds.	.	.	.	.	.
LARD, . . . . . cwt.	.	.	1,777	.	1,809
CORN, GRAIN, MEAL, AND FLOUR—					
Wheat, . . . . . cwt.	256,400	.	198,200	157,200	260,700
Wheat, Meal and Flour . . . . .	69,100	9,300	17,200	13,200	47,100
Barley, . . . . . "	.	.	.	.	.
Oats, . . . . . "	.	17,300	.	.	.
Peas, . . . . . "	200	80	60	250	20
Beans, . . . . . "	.	.	.	.	.
Maize or Indian Corn, . . . . .	136,000	136,100	210,300	71,300	216,600
FRUIT, RAW—					
Apples, . . . . . cwt.	.	.	.	.	.
Currants, . . . . . "	.	.	.	.	.
Gooseberries, . . . . . "	.	.	.	.	.
Pears, . . . . . "	.	.	.	.	.
Plums, . . . . . "	.	.	.	.	.
Grapes, . . . . . "	.	.	.	.	.
Lemons, . . . . . "	.	.	.	.	.
Oranges, . . . . . "	.	.	.	.	.
Strawberries, . . . . . "	.	.	.	.	.
Unenumerated, . . . . . "	.	.	.	.	.
HAY, . . . . . tons	.	.	.	.	.
STRAW, . . . . . "	150	.	80	100	207
MOSS LITTER, . . . . . "	62	62	48	51	15
HOPS, . . . . . cwt.	.	.	.	.	.
VEGETABLES, RAW—					
Onions, . . . . . bushels	220	180	.	.	.
Potatoes, . . . . . cwt.	.	.	.	.	.
Tomatoes, . . . . . "	.	.	.	.	.
Unenumerated, . . . . . £	.	.	.	.	.
Dried, . . . . . cwt.	.	.	.	.	.
Preserved by Canning, . . . . .	.	.	.	4	.
POULTRY AND GAME, . . . . . £	.	.	.	.	.

\* This Table is confined to the Imports of certain kinds of Agricultural Produce into to a request from this Department kindly consented to separate the Irish Imports (direct) form of Weekly Returns. It is hoped that the Department may soon be able to secure With these and such returns as the above, the Department will be in a position manufactured and agricultural products.

PRODUCE Imported direct (i.e. from the Colonies or Foreign Countries)  
4th March, 1905, to 27th May, 1905\*.

WEEK ENDED							
8th April.	15th April.	22nd April.	29th April.	6th May.	13th May.	20th May.	27th May.
.	.	.	.	.	.	.	.
.	3,430	.	.	.	.	.	.
.	2,570	.	.	.	.	.	.
.	.	96	.	.	95	.	.
.	.	1	.	.	.	.	.
.	.	20	197	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	286	.	6	.	.
.	.	.	.	.	.	.	.
149	198	219	199	144	106	136	143
18	37	41	151	25	2	36	74
.	.	.	.	.	.	.	.
.	.	.	.	.	39	.	602
.	255	.	2,354	.	297	259	.
6,200	154,900	52,300	81,000	177,700	99,300	77,100	139,000
3,800	15,000	21,800	7,200	2,500	11,100	8,300	4,000
.	21,500	16,000	.	.	.	11,000	.
30	60	24,200	31,200	.	12,700	.	.
.	.	40	20	20	100	50	.
130,300	30,000	174,300	182,600	38,100	34,300	70,000	68,800
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
1	.	.	7	19	.	.	12
.	.	96	225	134	.	240	103
2	44	19	65	2	.	61	70
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	15	.
.	.	.	1	.	10	.	.
.	.	.	.	.	.	.	.

Ireland from the Colonies and Foreign Countries. The Board of Customs have in answer from those of the United Kingdom, and to supply this Department with them in the returns of Imports of all classes into Ireland which are re-shipped from Great Britain, to gauge the economic dependence of this country on other countries for its supplies of

Statistics and Intelligence Branch,  
Department of Agriculture  
and Technical Instruction for Ireland.



## EMIGRATION.

RETURN of the Numbers, Nationalities, and \*Destinations of the Passengers that left the United Kingdom for places out of Europe during the Month ended 31st May, 1905, and the Five Months ended 31st May, 1905, compared with the corresponding periods of the previous Year.

NATIONALITY.	BRITISH EMPIRE.						FOREIGN COUNTRIES.				Grand Total.	Total for corresponding Period of 1904.
	British North America.	Australia and New Zealand.	British South Africa.	India, including Ceylon.	Other British Colonies and Possessions.	Total.	United States.	Other Foreign Countries.	Total.			
Month ended 31st May.												
English, . . .	8,823	638	1,091	85	196	10,833	5,120	323	5,443	16,276	14,831	
Scotch, . . .	2,070	113	267	13	9	2,472	1,961	22	1,983	4,455	3,674	
Irish, . . .	546	51	85	1	3	686	5,102	21	5,123	5,809	5,736	
Total of British origin.	11,439	802	1,443	99	208	13,991	12,183	366	12,549	26,540	23,741	
Foreigners, . . .	3,922	27	332	5	28	4,314	13,851	180	14,031	18,345	13,545	
Nationalities not distinguished.	5	-	-	40	139	184	29	169	198	382	385	
Total, . . .	15,366	829	1,775	144	376	18,489	26,063	715	26,778	45,267	37,671	
Total for corresponding period, 1904.	11,776	808	1,972	225	324	15,105	22,043	523	22,566	37,671		
Five Months ended 31st May.												
English, . . .	32,301	3,267	6,896	1,026	1,548	45,038	23,221	2,111	25,332	70,370	60,991	
Scotch, . . .	6,460	458	1,604	66	73	8,661	7,044	221	7,265	15,926	13,413	
Irish, . . .	1,565	186	414	2	13	2,180	20,585	93	20,678	22,858	18,276	
Total of British origin.	40,326	3,911	8,914	1,094	1,634	55,879	50,850	2,425	53,275	109,154	92,680	
Foreigners, . . .	10,489	91	1,601	46	105	12,332	65,303	1,863	67,166	79,498	55,066	
Nationalities not distinguished.	11	-	-	574	788	1,373	373	1,143	1,516	2,889	2,395	
Total, . . .	50,826	4,002	10,515	1,714	2,527	69,584	116,526	5,431	121,957	191,541	150,131	
Total for corresponding period, 1904.	41,972	4,091	11,806	1,866	2,532	62,267	84,169	3,695	87,864	150,131		

\* The destinations given are, in all cases, based on the ports at which the passengers contracted to land.

NOTE.—The above figures, being made up at the earliest possible date after the close of each Month, are subject to correction in the Annual Returns.





10. *Journal of the American Medical Association*, 277:1033-1034, 1997

## NEW DELHI.